

TOWARDS A DESIGN METHODOLOGY - A case of chawls in Bombay

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B.Arch., Bombay University 1980

SUBMITTED TO THE DEPARTMENT OF ARCHITECTURE IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS OF THE DEGREE OF MASTER OF SCIENCE IN ARCHITECTURE STUDIES
AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY
June 1983

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by

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ABSTRACT

My research stems from a dilemma. The dilemma lies in the type of housing I intend dealing with. While the type is being increasingly disregarded for being inappropriate and obsolete in the present day context generally all over the world, it still is the most popular form of housing in Bombay. Current trends in the city reflect even the housing cooperatives adopting this type.

The general type referred to is the high density low income housing for the industrial labor force with back to back dwelling units as seen in Britain and elsewhere in the western world.

The particular type of housing in Bombay is known as the 'chawl'. Although believed to be a direct derivative of the western model, the chawl still has essential differences both as a physical as well as a social unit, an understanding of which is essential in comprehending the apparent preference of the chawl as a house type. Within the basic type, several sub-types could be detected, a comparison of which would help accentuate the differences mentioned above, since some of them are exact replicas of the western model while certain others seem to be a product of local conditions and typical Indian life-styles.

I am interested in looking at the chawl morphologically, with an ultimate objective of developing it further as a viable form of housing in the present context. The research is concentrated on developing a design methodology, and not on formulating planning strategies.

Also, since the chawls comprise of minimum dwelling units, I am also interested in introducing the concept of an evolutionary housing principle as it applies in the context, and incorporating it as a part of my design methodology.

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S. S

PART I

INTRODUCTION

Intensive urbanism and urbanization are inevitable phenomena of demographic evolution, economic growth and man's desire for better life. Bombay is no exception to these phenomena. Like most cities in developing countries, Bombay's trend of development due to them has been Laissez-faire accretion or chaotic megalopolitanism. People would have to be provided with wholesome and satisfying conditions of living, if sardine-packed Bombay is not to be a permanent focus of conflict, nervous tension and deep discontent.

Unfortunately, Housing, which forms one of the prime determinants of urban living standards, continues to be a form of Gordian knot, baffling all those concerned in rectifying it. I have always found housing and all its aspects of design methodology to be most intriguing, a fact which could be attributed to my architectural background coupled with the recognition of the scope of such a research. After a couple of explorations with the SAR methodology here at MIT, the potential for developing my design research along the same direction seemed evident. Consistent with my research interest, I started my search for a house type in the context of Bombay which was both simple in character as well as had the potential for being developed as a viable design strategy, given the present situation. The idea of selecting a house type for this study instead of trying to invent one seemed more rational because this way one can have a base towards understanding the nature of the problems, thereby providing more validity to one own decisions and value judgements.

The study therefore, is essentially concerned with the search for meaningful design responses towards the current problems envisaged in Bombay. The current trends of housing one observes in Bombay make the rationale for such a study not only useful but more convincing.

The study however may be regarded as an abstract exercise since it is not site specific and neither is it meant for a particular group of people (aside from the fact that it deals with the situation in Bombay and is predominantly for the low and middle income group of people); it is rather a model which takes contextual characteristics into account- in this case the morphological particularities of the chawl type of dwelling, and incorporates them as guiding premises in the design process. The reasons for selecting the chawl are manifold

Although most of what is left of the chawls is in derelict and dilapidated condition, it still continues to house the majority of Bombay's growing population.

Most of the chawls are located in areas where pressures of the city's uncontrollable urban problems are felt most. Yet inspite of all the problems and critiques against the type, its preference amongst the resident groups staying in them cannot be denied. Apparently, proximity to place of work does not form the only reason for this preference, suggestive of the fact that the chawl does comprise of elements that are socially and culturally compatible with the Indian life-style.

The growth of chawls has in a way been synonymous with the growth of Bombay. Any house type that could survive such a massive onslaught of urbanization as the one Bombay has experienced certainly forms a logical base for any study that aims at problems of this nature. It should be clarified at this juncture that the idea by no means is to reproduce existing standards (as most of them are in substandard condition) but to capture and incorporate some of the spatio-physical characteristics of the various domains, which are regarded as important layout components. However from the models, it might be possible that standards might have to be

altered to ameliorate living conditions and hence recommendations to that effect shall certainly be attempted.

The structure of the study has been organized in the following manner :

To begin with, my intention is to give the reader a broad overview of Bombay, capturing the developments that has taken place during the process of its evolution. This has been done in the form of visual images. Having thus set the contextual background, the study of chawl comprises the next part. The chawl is studied both in terms of its historical development as well as its form and structure. The idea of this part of the study was to understand the reasons behind the adoption of this house-type and the relationships that exists between the various elements comprising the house-type. From this part, the issues that are considered important in the present context, have been identified. This constitutes the first part of the study.

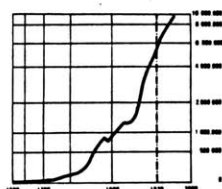
In the second stage, I have attempted a design exploration in the form of a support structure. Certain necessary assumptions are made and certain rules deciphered from the first stage, to be used as guiding premises in design. The design is conceived of as being an interpretation that could be possible adhering to the rules. It should be noted here that the assumptions are not absolute and will vary from project to project. The design is essentially done so that it could be used as a reference for the third stage wherein I deal with some of the issues identified in the first stage.

Only those aspects of the issues that deal specifically with design have been concentrated upon, since the nature of this research is design oriented. Undoubtedly, there are other aspects of these issues (aside from the ones that concern design decisions), like the political and administrative ones that will have to be tackled, if one is dealing with the implementation of the

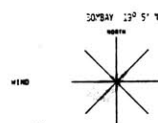
policy to build chawls. In dealing with these issues from the designers standpoint, my idea was to develop rules which are more specific and less abstract in nature. Ultimately, the intention was to formulate some comprehensive principles for chawls, so that any designer who has to intervene in such a context can find useful in developing his own approach. The study therefore is more broad based and general in nature rather than being restricted to a site and being project specific.



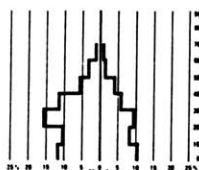
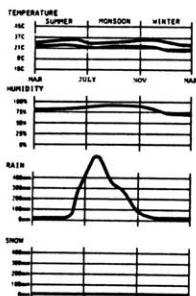
CONTEXT



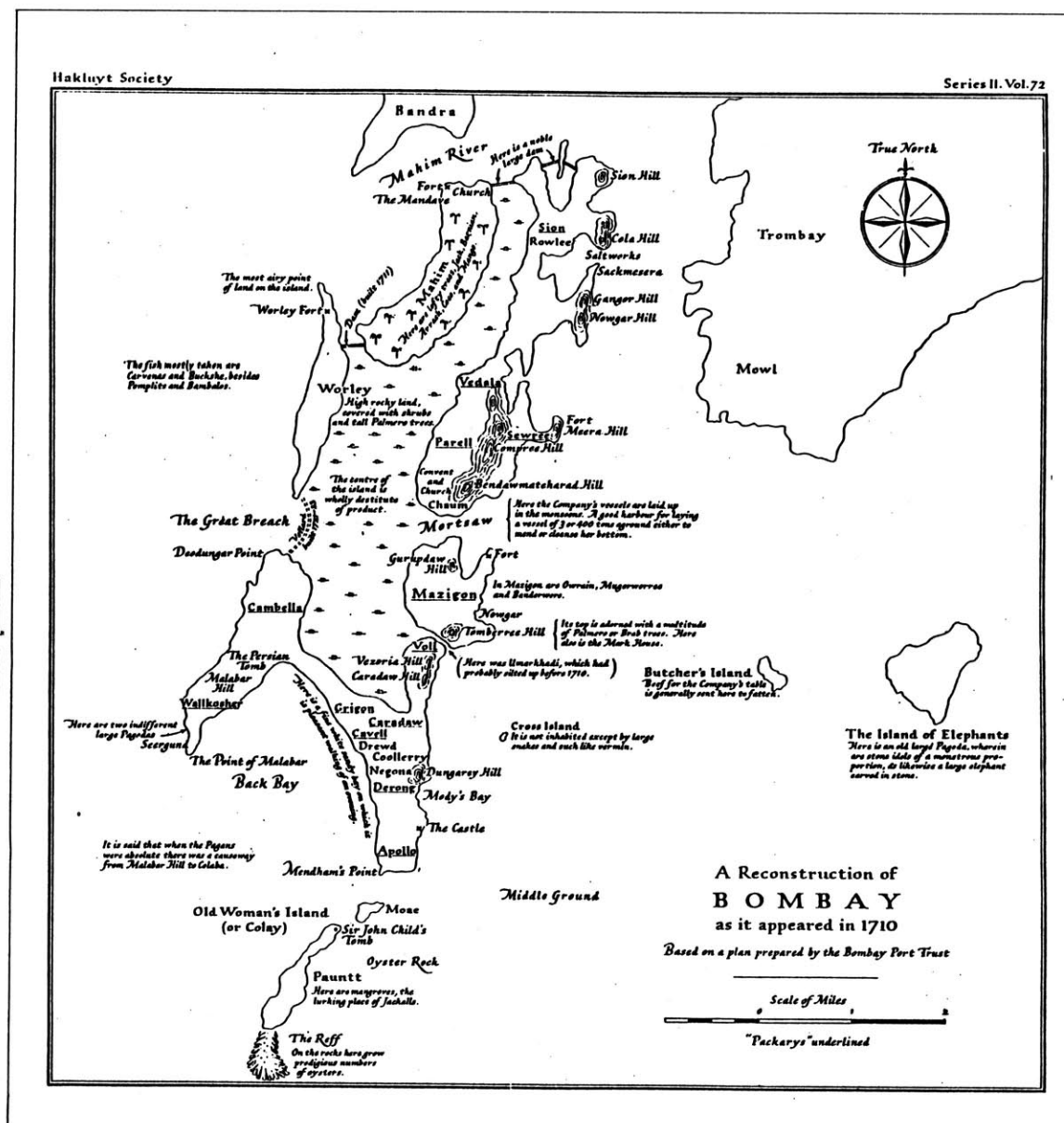
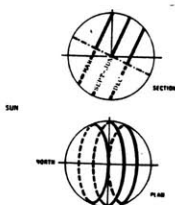
URBAN POPULATION GROWTH
Horizontal: Rates vertical: population
Source: BOMBAY: AN EXPLODING METROPOLIS
A.S. ARUNACHALAM



URBAN ANNUAL INCOME DISTRIBUTION
Horizontal: percentages vertical: dollars
Source: HOUSING SITUATION IN GREATER BOMBAY
P. SANKARANARAYAN, 1977, P. 13, 8.



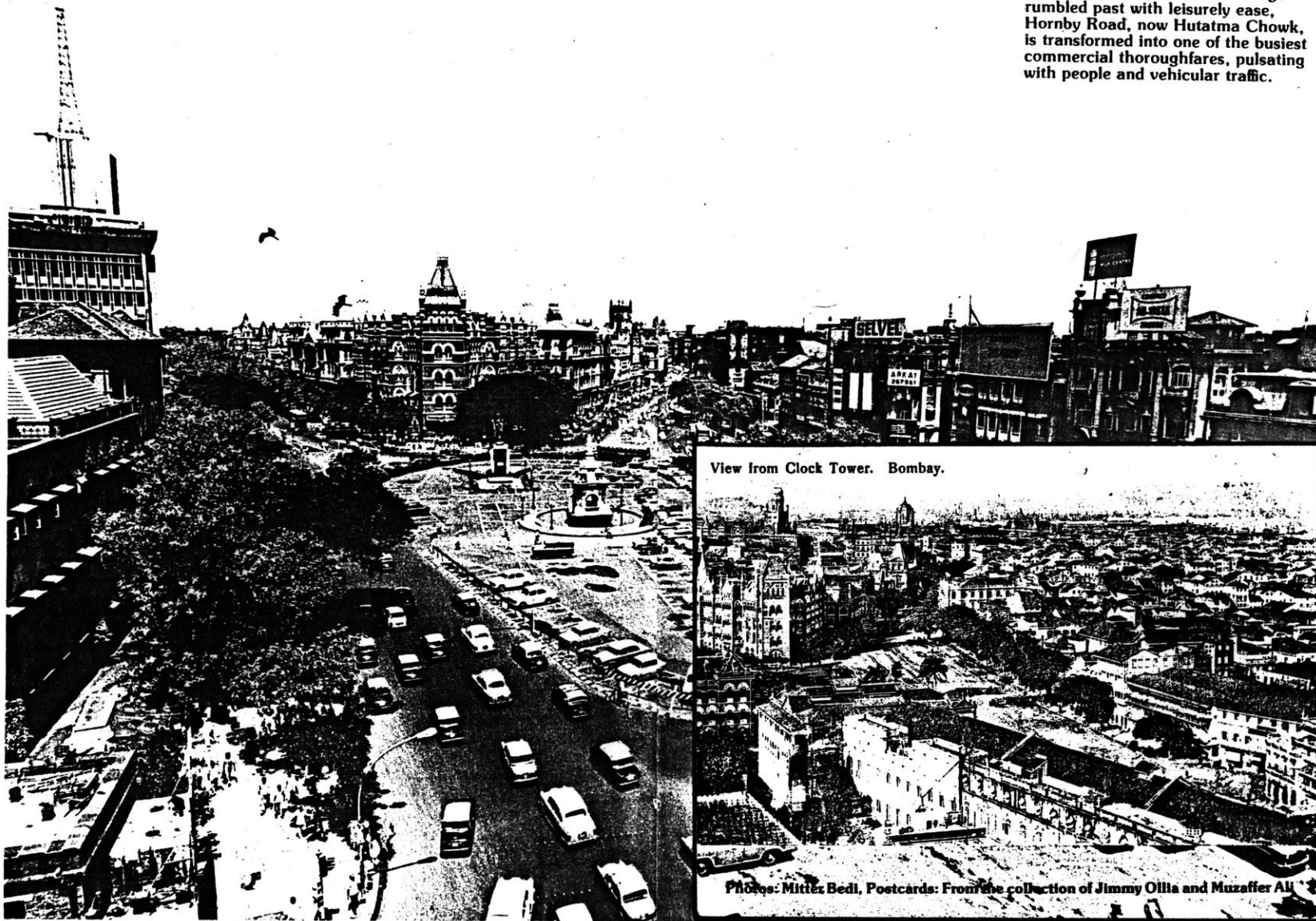
URBAN POPULATION DISTRIBUTION
horizontal: percentages vertical: ages
males: M females: F
Source: VILLAGES IN GREATER BOMBAY
A. C. DAKSHINAM, 1948, D.T.S.C.



Bombay is not a city but as many different cities as India has communities, a growing living entity with an enthralling evolution, a vital and spirited character of its own, holding a mirror image to the diversity, exuberance and sheer energy of its people.

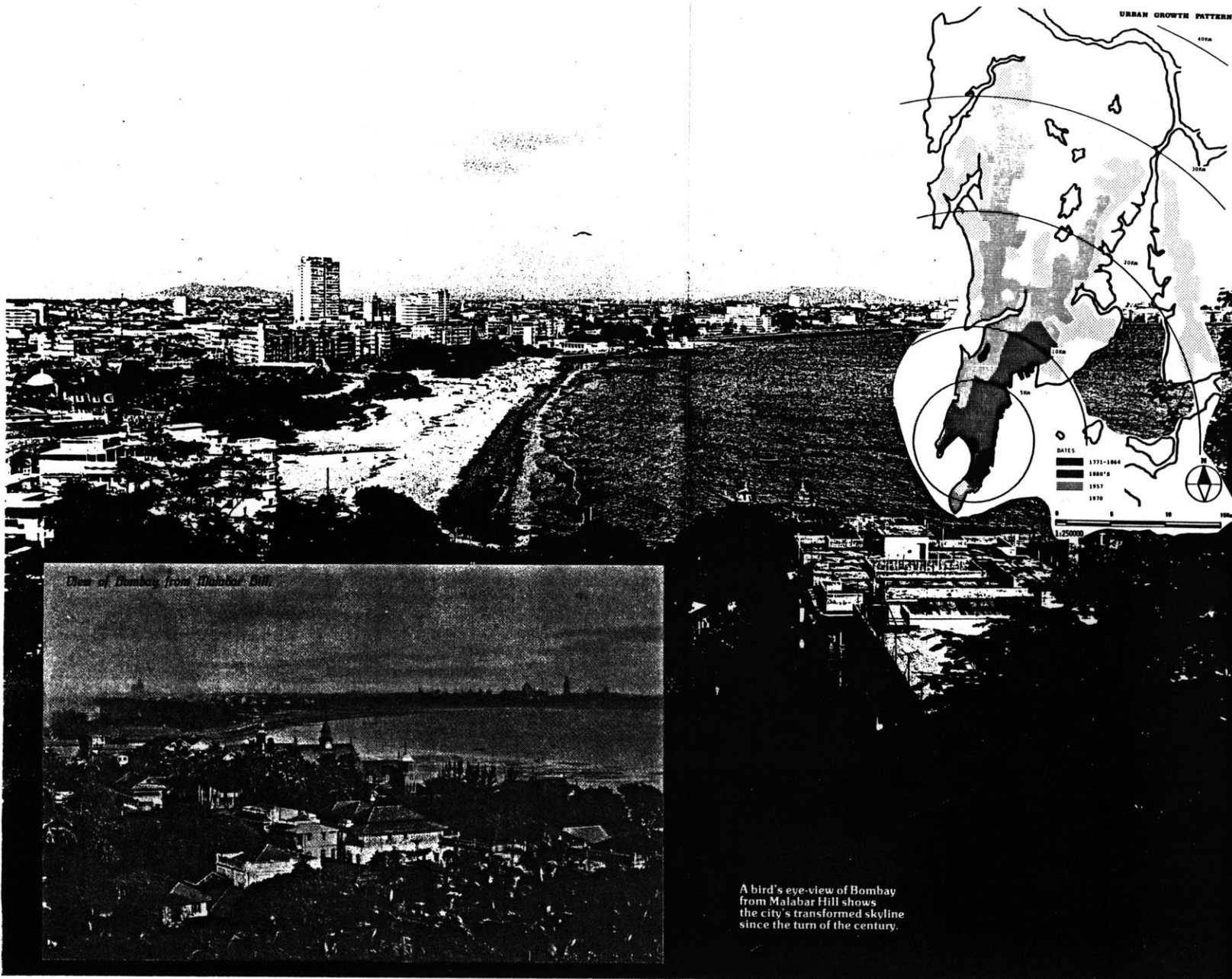


Once a pedestrian's paradise
in the heart of the city,
where only an occasional carriage
rumbled past with leisurely ease,
Hornby Road, now Hutatma Chowk,
is transformed into one of the busiest
commercial thoroughfares, pulsating
with people and vehicular traffic.

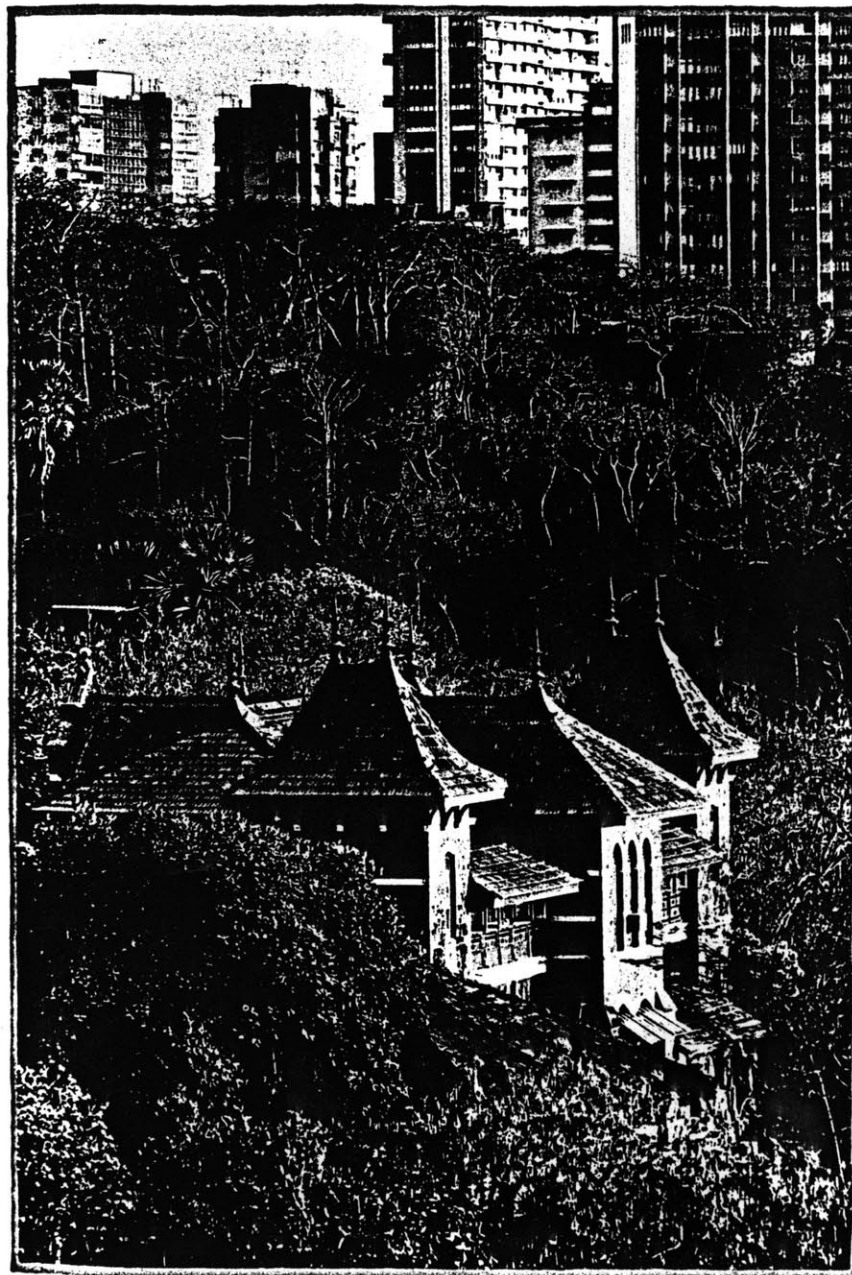


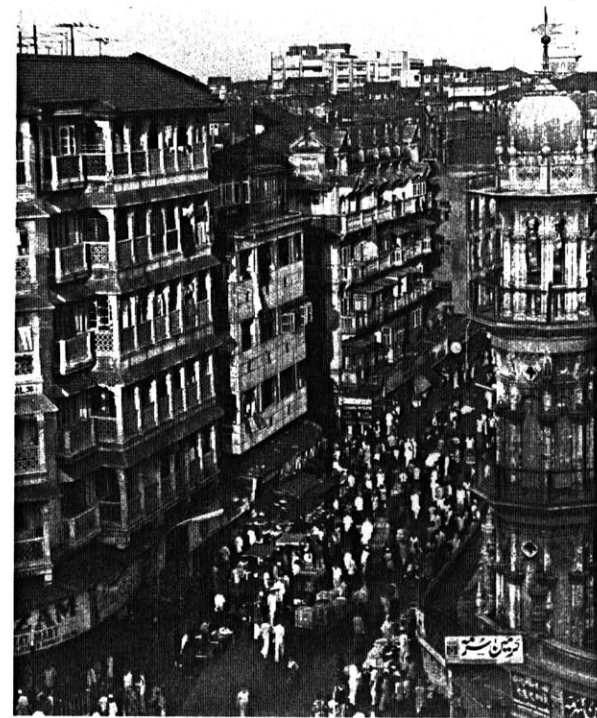
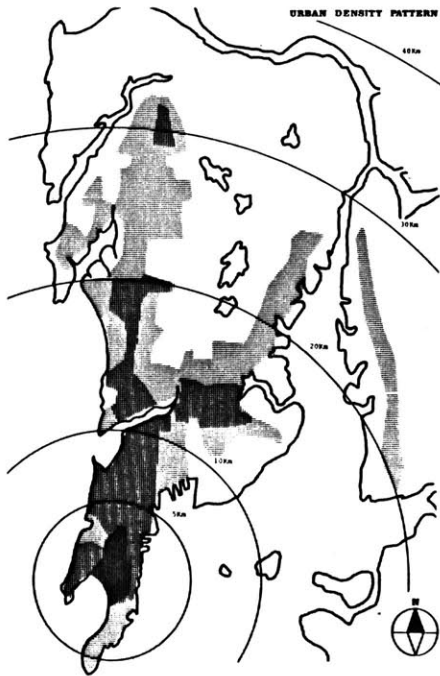
View from Clock Tower. Bombay.

Photos: Mittex Bedi, Postcards: From the collection of Jimmy Ollia and Muzaffer Ali

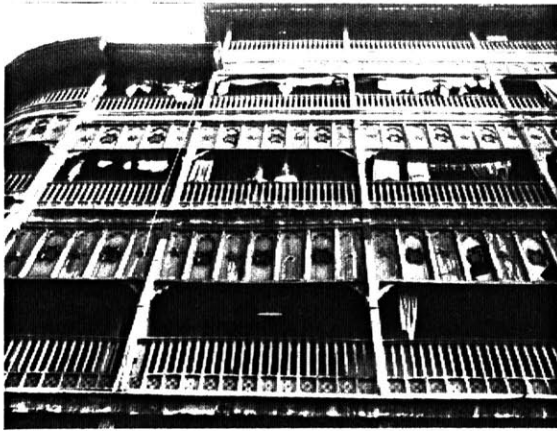


A bird's eye-view of Bombay from Malabar Hill shows the city's transformed skyline since the turn of the century.





It is true that the heart of Bombay and the real source of its cosmopolitan prosperity lies in these intensely crowded streets and lanes. Here are the cotton exchange and covered textile markets - the largest in the world. the silver and copper markets, great mosques and several ancient temples. Here, in one of the most densely populated places on earth are many chawls still surviving, huddled together between shop fronts, disguised by additional storeys.



THE CHAWL IN BOMBAY

1661 : The Portuguese by way of a parting gesture, gave a conglomerate of seven islands to Charles II of England as a part of his dowry. Life was difficult for the 10,000 odd inhabitants of these islands due perennial flooding of the creeks and the hordes of rotting fish that remained as a residue on the banks. Death rate was high and the only trade then was exporting coconut and coconut products. Bombay, till then was a nonentity in comparison with other major cities in India.

Four years later, the Imperial crown passed the islands to the East India Company on lease, who under the cover of trade and commerce had already initiated the imposition of colonial power in India. It was not long before the company realized the strategic location of these islands as they reverted from Surat to make Bombay their headquarters. The advent of the company hailed the era of Bombay's industrial development. It also earmarked the all too familiar phenomenon - migration. People from all parts of the hinterland began to move in as business opportunities increased and by the end of the eighteenth century, Bombay's population was more than 1,00,000. It was the East India Company's illegal opium trade (in which the native businessman from Bombay helped) and increasing cotton export to England, that made possible the accumulation of capital to establish the industries in Bombay.

1861 : The outbreak of American Civil War completely ceased export of cotton from America to Britain, & Bombay developed rapidly. New industries resulted in the influx of more immigrants within a very short period of time and soon Bombay was faced with the problem of acute housing shortage. That is when the first chawl was developed, primarily by the industrialists to house its employees. The other interesting occurrence was that some landlords who owned huge houses, decided to subdivide

them into smaller units to generate additional income. These houses also assumed the name of chawls. This trend of subdividing bigger units can be observed later on also, when Bombay had a similar population explosion.



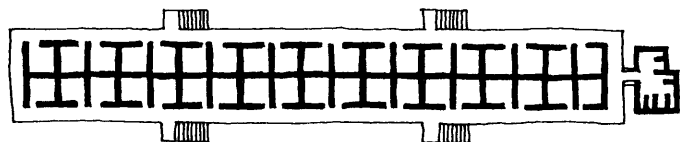
The initial developments were single story, one room, back to back tenements with common sanitary facilities. Originally intended for one person, living conditions in them soon deteriorated drastically, as families of the immigrants moved in, inflicting severe load on the infra-structure.

The chawls soon became the most prolific form of housing as rents were cheap and within affordable limits of even the lower income groups and space became an expensive commodity. Material and labor were cheap and easily available and there was hardly any municipal control over these

developments.

In the case of several privately developed chawls, the residents all belonged to a single community, usually the same as that of the developer. The size of the tenements were bigger and housed a mixed income group of people, since community ties assumed the most important selection criteria. The layout was peripheral with a courtyard in the middle and to achieve higher densities they were built upto five storeys high. The type seems to have its roots in the rural courtyard form where it was adopted as it suited the joint family structure of the Indian household. The community in many ways reminds one of a joint family at a bigger scale.

With the establishment of Bombay Municipal Corporation in 1865, even the public sector started developing chawls. Strangely enough, the form adopted was more reminiscent of the obsolete western model instead of a refined local one, with the result that they ended up being an absolute disaster to the point that the government decided to use pressure tactics threatening the workers a cut in their rent allowances if they refused to move in. I refer to the western model as obsolete here because during that time there was a furor over the poor and unhygienic living standards prevalent in the industrial workers housing in Europe. These were the back to back single room tenements, that were adopted by the local government to house the labor force in Bombay.



The nineteenth century ended with the outbreak of deadly plague epidemic in Bombay. The city's population slumped drastically from 8,00,000 to 6,00,000 as there was no proper cure for the epidemic.

It was then that the Bombay Municipal Corporation sought to improve hygiene condition in the city's congested areas by introducing the Bombay Improvement Trust Act and establishing the Bombay Improvement Trust in 1915. The trust was created with power to acquire, hold, improve and dispose of the land for private developments, after carrying out all development works such as roads, sewage, water-supply and lighting. Accordingly, land was acquired and subsequently leased to developers with all infra-structure, amenities, schools and hospitals and prescribing rules with respect to specific uses, open spaces, heights of buildings etc.

The policy did not succeed as it was expensive and finances required were astronomical, following the first world war. Besides, economy was at its lowest ebb and depression severe. Eventually in 1937, the Bombay Improvement Trust had to be scrapped. During all this period however, the authorities continued to build chawls adhering to the prototype they had been developed earlier, before the trust act.

1939 : The second World War spurred Bombay's process of urbanization once again (the effect of the war being in a way catalytic), as industrialists motivated by the proposition of profit making under the cover of 'war efforts' located the industries in the very areas that needed development. The demand for chawls rose drastically due to this haphazard, unplanned industrial growth. The other effect was the overcrowding of the existing chawls. Moreover, construction of residential buildings was altogether stopped, to make the situation worse.

Forced by this situation and by mounting pressure from the tenants

organisations, the government had to revise the rent control act in 1942, by which revision the existing rents were frozen and security of tenure guaranteed to the tenants. This helped the government stabilize the housing situation and it was beneficial to the chawl resident, whose tenancy became permanent and cheap.

In 1942, for a brief period, people deserted the city on account of an aerial raid scare - only to come back in greater numbers. Meanwhile, Bombay's growth rate reached its peak, while due to the rent control freeze, new construction almost came at a standstill as it was not a lucrative proposition for the private developer anymore. In fact, since then the private sector involvement in housing has been restricted to the higher income groups exclusively, on a strictly speculative basis.

The housing situation in Bombay has changed since then, only for the worse. A unprecedented growth resulted in radical changes in the land-use pattern, which was the cause for an entirely new and chaotic trend of development for decades to come. Areas originally residential were invaded by offices, restaurants and even noisy trades. Today, hawkers abound everywhere, heavy traffic now passes through most of the areas and quiet living has given place to cacophonous centres of street life. This haphazard urbanization phenomenon had its share of adverse effects on the chawls, for the well to do chawl resident (in the chawls that were built by private developers) no longer thought it fit for living. Some of the chawls thereby lost their mixed income characteristics as this population shift resulted in more low income families and greater densities. The outcome was inevitable - severe inadequacies in infra-structure facilities and further deterioration of living conditions, as the authorities and the landlords were unable to maintain them due to extremely low per capita rent. Efforts at

relocating the lower income groups have failed as the individual self contained units provided was unaffordable to the target income group. Besides, proximity to place of work also is a critical factor that can vary these families' affordability substantially (anywhere between 5% to 40% of their income could be spent on transportation costs alone) and few of the relocation sites can match the locational advantages of the chawls.

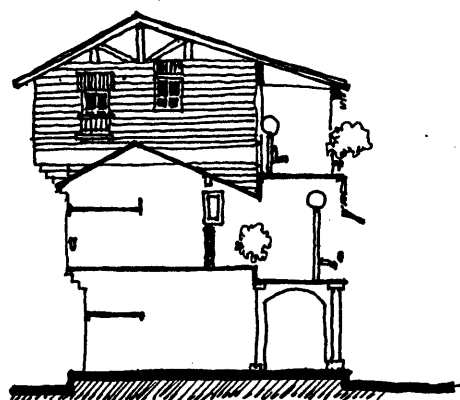
Today, inspite of all the massive onslaught of urbanization, abuse and dilapidation of them, the chawls continue to comprise Bombay's major housing stock (around 61 %). Many of them still retain their mixed income homogeneous composition and seem to be more socially and culturally acceptable than other alternatives, judging from the reluctance on the part of the residents to move elsewhere.

MORPHOLOGY OF THE CHAWL

A "CHAWL" or a "CHAAL" in native language means a passage or a corridor. Later on, as the house-type of tenements with a corridor attached to it was developed, this name was given to it.

A Chawl therefore by its very definition implied tenements with a mandatory corridor and common facilities. The number of rooms can vary between one and two or occasionally more than two.

Strangely enough, inspite of the broad definition, the chawls amongst many pundits and laymen alike, have come to be associated with an obsolete house-type, which to me seems to be a misconception. Unfortunately, the present derelict condition of them helps only reinstate this misconception. The definition itself could be open to a lot of stimulating interpretations- think of row houses stacked vertically one on top of the other with streets at each level serving as accessways, as one interpretation of the type. (this of course would be romanticising the chawl, but it is possible nonetheless and is useful for the purposes of testing the type to its full extent).



THE CHAWLS - A ROMANTIC VIEW

Essentially, the elements comprising a chawls are - the dwelling unit consisting of the balcony, and the dwelling unit (which can vary from single to double to sometimes more than two rooms), the corridor, the common services like toilets and bathrooms, and the courtyard.

Almost any combination of the elements mentioned is possible by the definition. The definition simply states a house-type with these elements. That is why the chawl has such a wide variety of interpretations.

The chawls have had radically different interpretations amongst the agents responsible for developing them, which give them entirely diverse characteristics from one another. On the one hand we have chawls developed by the government and certain mill owners which are in the form of individual buildings with single room dwellings placed on each side of a central corridor, on the other hand we have chawls (developed by the private developers which have) two room dwellings with corridor running along one edge of them - the elements are the same but their disposition being different they have characteristics which are very different as is apparent when one notices the use of the corridor for example.

Then again we have the nature of the open spaces - in some we find the open space being used as a courtyard serving all the residents as a place where their children can play, where all their numerous festivals could take place, and as a place where the older folk can relax and chat without the fear of being run down any minute by the maddening traffic. In certain other we find the courtyard serving as a light well, which even if for nothing else is being used by the people for drying clothes and in the third case we find an open space that is not used by any one at all except as a dumpyard may be.

They exist in a huge range of shapes and sizes - right from the size of a

small lot to the size of an entire block and the same is true of their form - right from the standard rectilinear form to an organic form that is totally guided by the site. Even the heights have a wide range of variation from single story to five storeys. Clearly, it seems that the chawls have both the extremes of aspects that are extremely favorable and desirable in any house type, while at the same time the same aspects are so poor that they need to be avoided at all times. Yet the elements comprising the chawl that produce these aspects are the same. Rules must therefore exist that can generate the right relationships of these elements to produce the desirable environment.

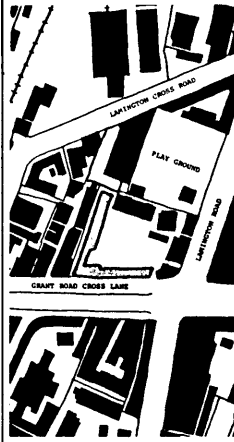
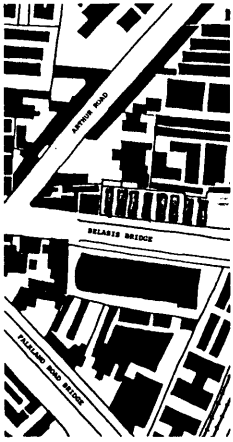
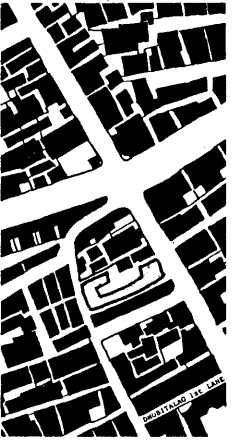
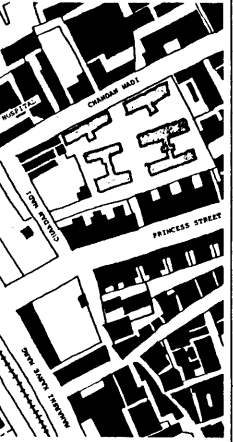


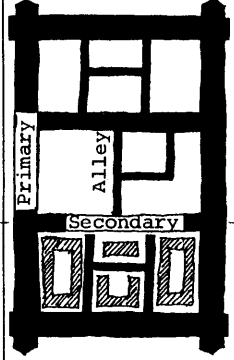
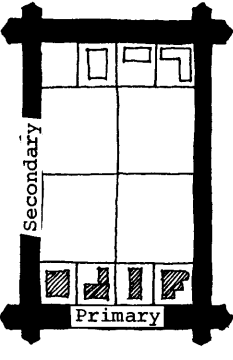
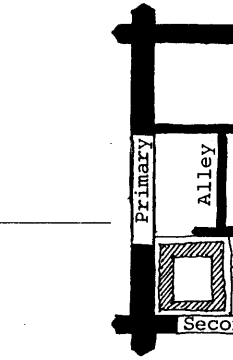
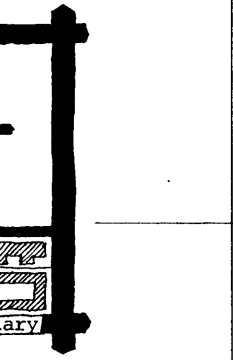
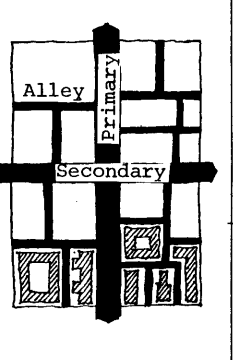
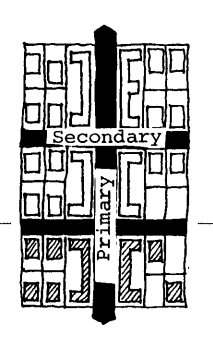
Within the private bounds of a chawl, there exists a hierarchy of levels in spaces. The courtyard is the most accessible to all residents of the chawl and hence forms the public domain. The next is the semi-private domain of the corridor which essentially for residents belonging to that particular floor the corridor is in and the third is the private domain of the dwelling unit of the user. The degree of control on each of these domains could be observed through the nature of user intervention.

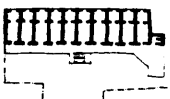
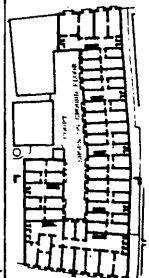
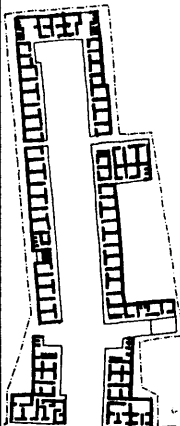
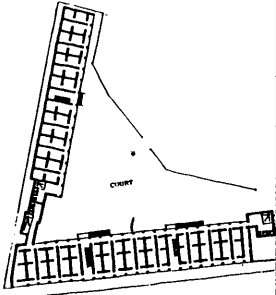
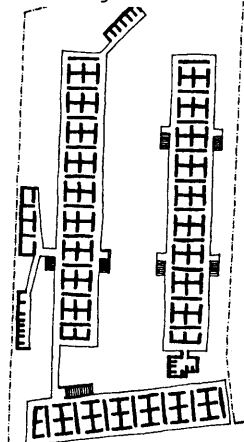
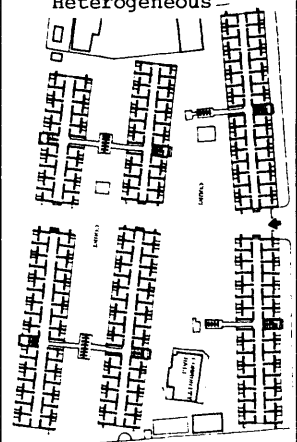
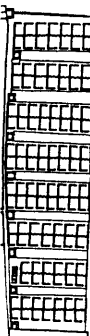
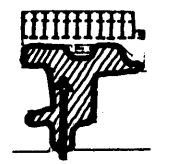
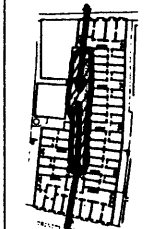
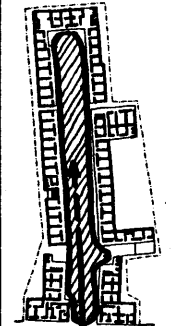
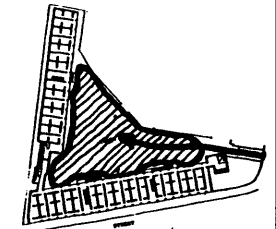
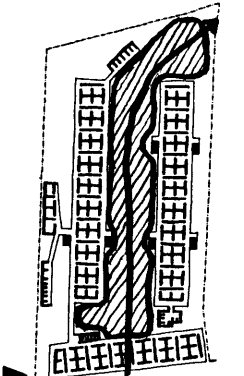
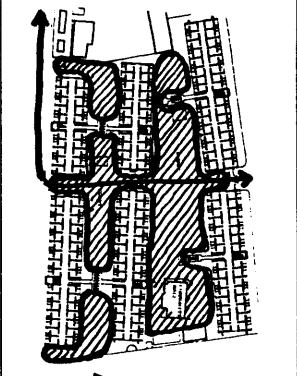

My analysis has been conceived in three levels :

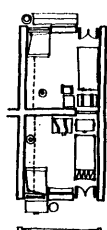
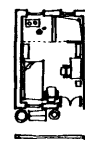
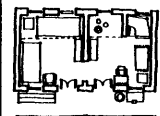
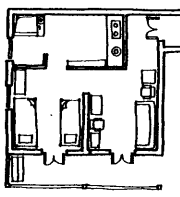
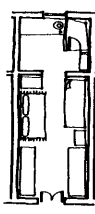
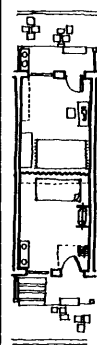
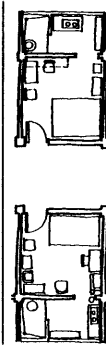
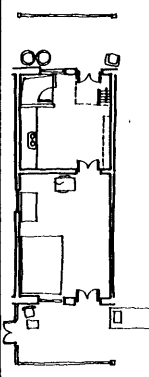
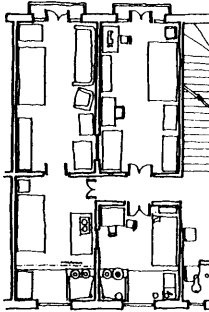
- The highest level considered is the urban tissue level wherein the chawl is looked at in the broader context as an element in the urban fabric and its relationships to other elements in the fabric is studied.
- The chawl at the block level is the next level in the hierarchy. This part deals with the various elements comprising a chawl and their relationships to the site and to one another. The elements have been identified as the corridor, the staircase block, the dwelling units, common services, shops and workshops and the courtyard.
- The third level studied is the level of the dwelling unit. The approach of dealing is the same in the sense that here also the elements of the dwelling units namely the balcony, room or rooms and other additions in the form of lofts etc. are analysed in relation to each other and in relation to dwelling unit.

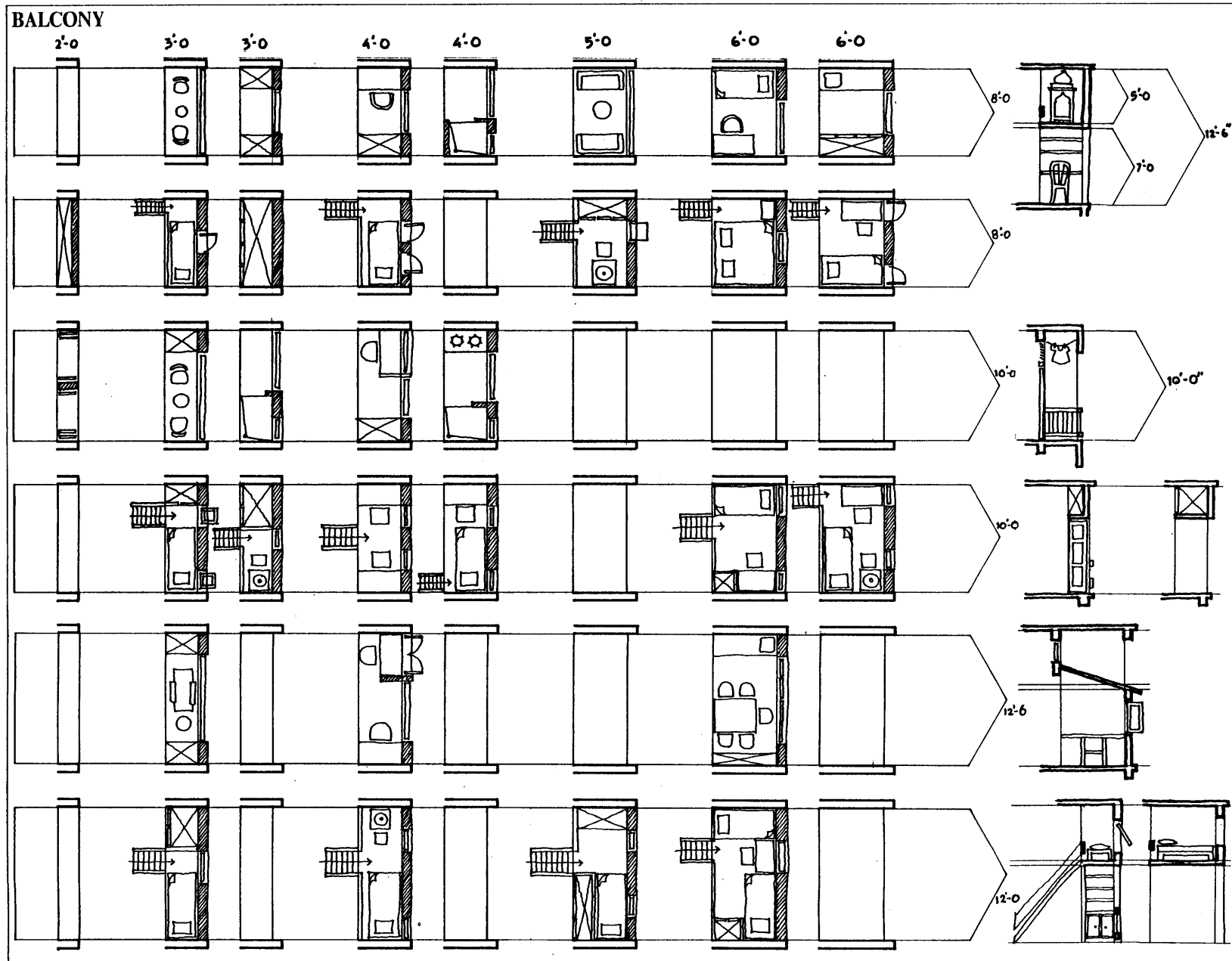
The case studies given represent a wide variety of these relationships and have been intentionally selected from all three zones - namely commercial, residential and industrial. The idea here is to simultaneously evaluate these relationships from which one can develop a criteria for choice.

TISSUE LEVEL

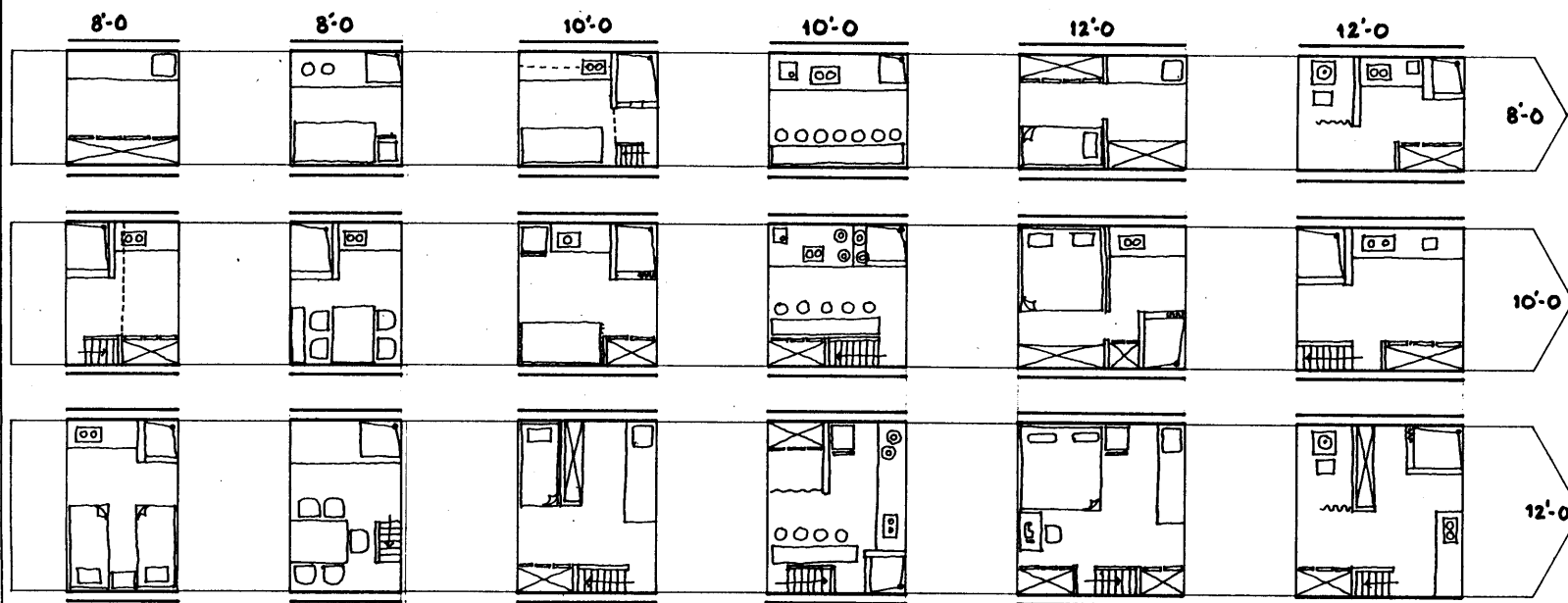
						
LOCATION	Residential Zone	Industrial Zone	Commercial Zone	Commercial Zone	Commercial Zone	Industrial Zone
TRAFFIC PATTERN						
DENSITY PATTERN	Dense	Dense	Very dense	Very dense	Moderately dense	Not dense
COMMERCIAL ACTIVITIES	Along all streets	Along primary and secondary streets no alleys	Along primary and secondary streets		Along all streets	Along primary streets only no Alley

BLOCK LEVEL		Low income	Mixed income Heterogeneous	Mixed income Single Community	Low income Heterogeneous	Low income Heterogeneous	Low income Heterogeneous
	Mixed income Heterogeneous	Single Community					
							
LAYOUT	Individual Block	Peripheral	Peripheral	Peripheral	Peripheral	Individual Blocks	Ind Blocks
ACCESS							
COURTYARD	Defined Entranceway			Defined Entranceway			
ORIENTATION	▲	▲	▲	▲	▲	▲	▲
CONSTRUC TION TYPE	Timber and Brick	R.C. and Brick	Timber and Brick	R.C. and Brick	Timber and Brick	R.C. and brick	Brick
SANITARY FACILITIES Ratio number of toilets to dwelling	1 to 5	1 to 4	1 to 6	1 to 4	1 to 6	1 to 8	1 to 10
HEIGHT	4 st.	5-6 st.	4 st.	5 st.	3 st.	4 st.	1 st.

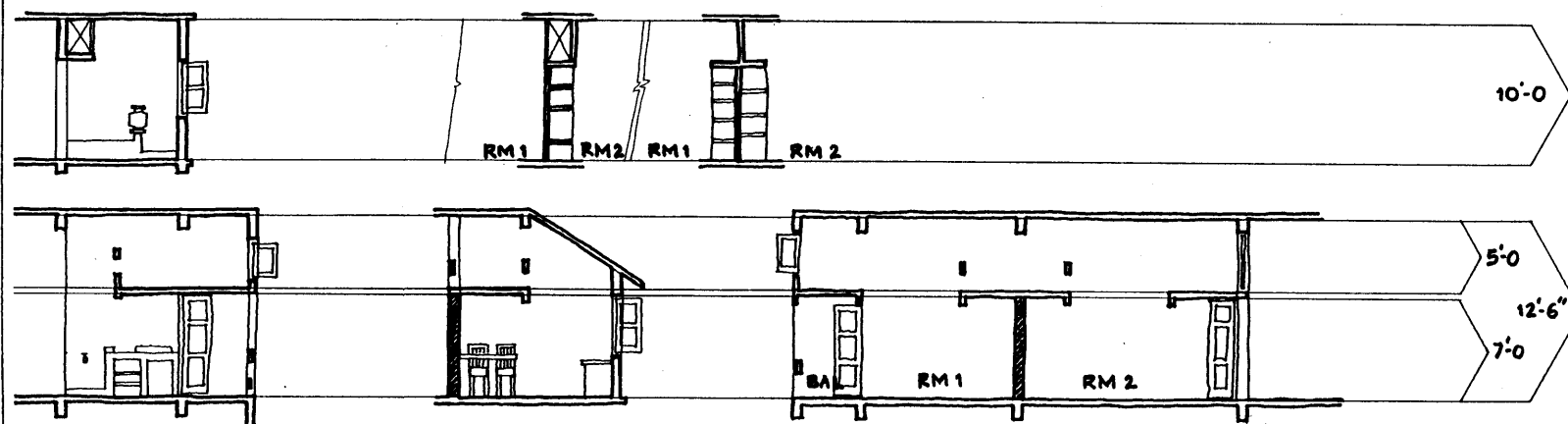
DWELLING LEVEL									
									
NUMBER OF PERSONS LIVING	5-6	6	6	8	6	7-8	6	5-6	5
AREA sq. ft.	200	102	153	351	208	96	138	230	300
SIZE ft.	10' x 20'	8'3" x 12'3"	9'3" x 16'6"	18' x 19'6"	9'3" x 22'6"	8' x 12'	9'6" x 14'6"	10' x 23'	10' x 30'
STATE OF INFRASTRUCTURE	Inadequate	Inadequate	Inadequate	Inadequate		Inadequate	Inadequate	Adequate	Adequate
FLOOR TO CEILING HEIGHT	9'-6"	10'-0	10'-0	10'-0	12'-0	12'-6"	10'-0	12'-0	12'-0
USE OF OTHER SPACES	Corridor sleeping drying clothes Lofts	Corridor drying clothes sleeping Lofts sleeping	Corridor sleeping Lofts sleeping	Corridor drying clothes Lofts	Corridor storage sleeping Lofts	Balcony kitchen Corridor drying clothes Lofts sleeping storage	Balcony kitchen Corridor storage Lofts sleeping storage	Balcony sleeping Corridor sleeping storage drying clothes income generating activities Lofts	Balcony Corridor Lofts



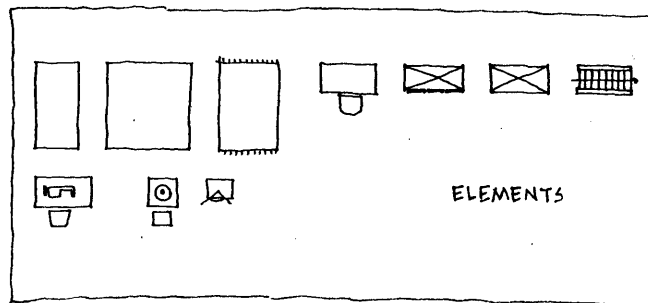
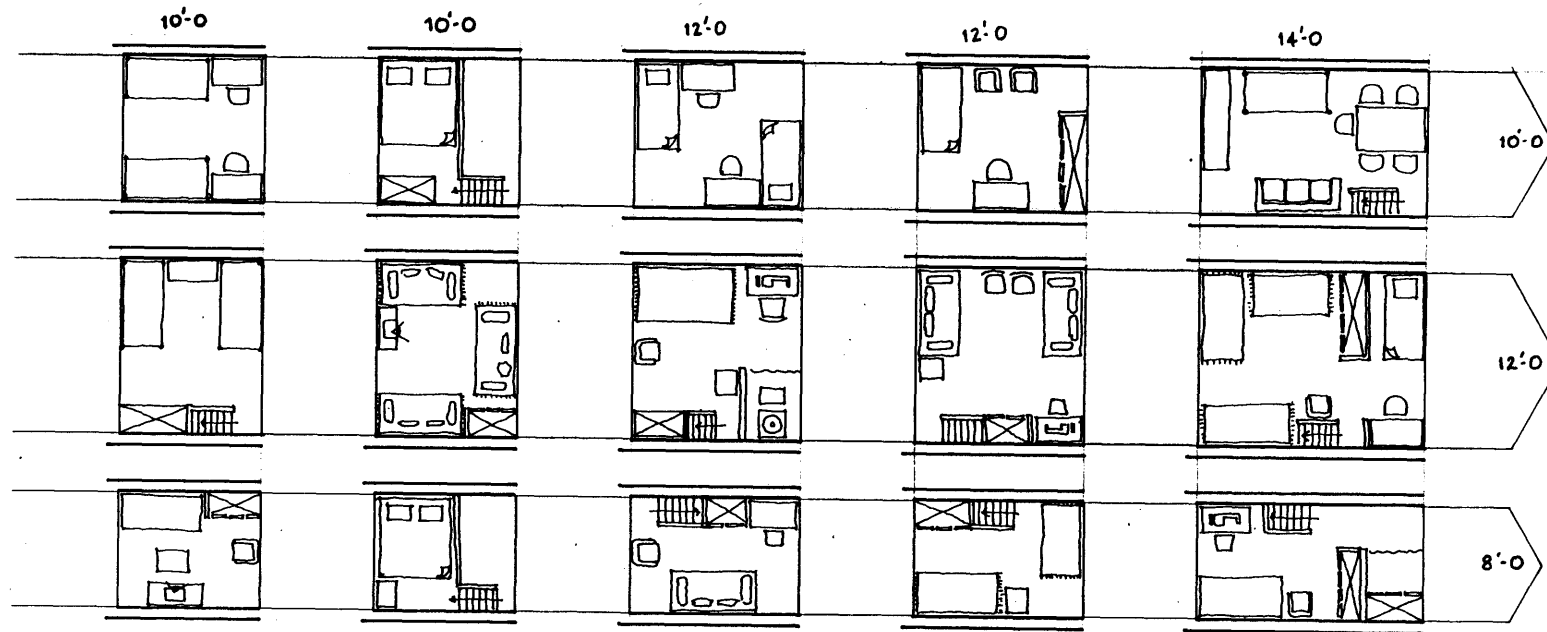
ROOM 1



In case of single room dwellings, space usage is similar to Room 1

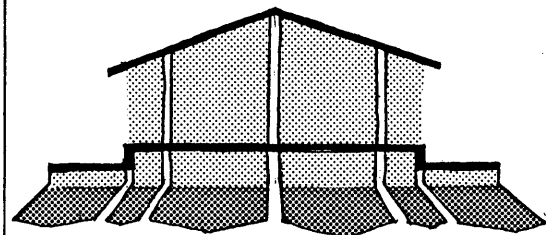


ROOM 2

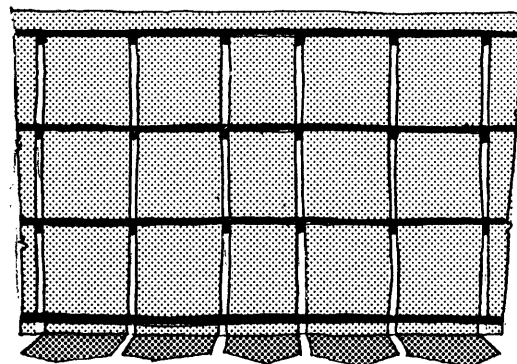


GENERAL OBSERVATIONS

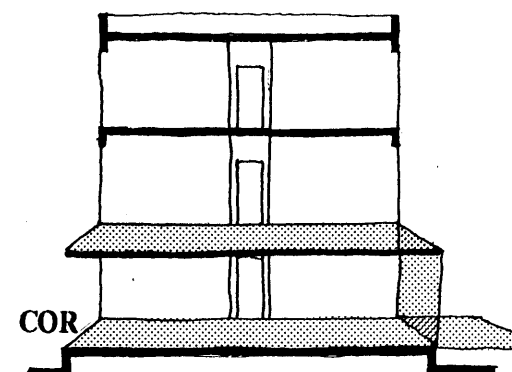
MODELS



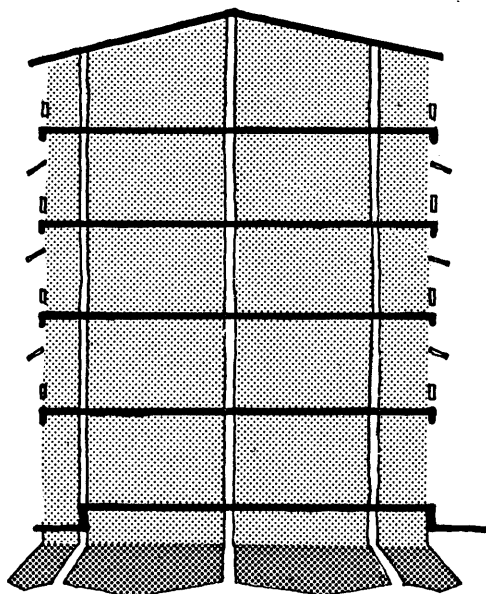
COR BAL DW 1 DW 2 BAL COR



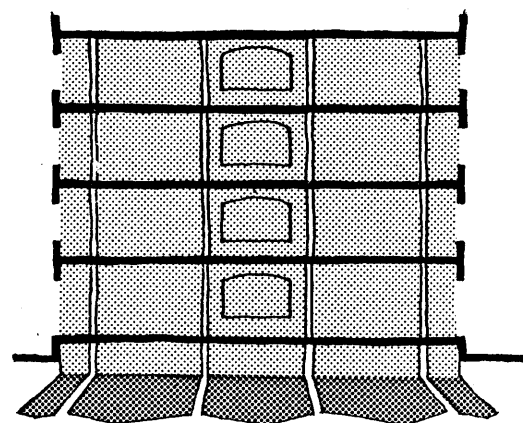
DW DW COR DW DW



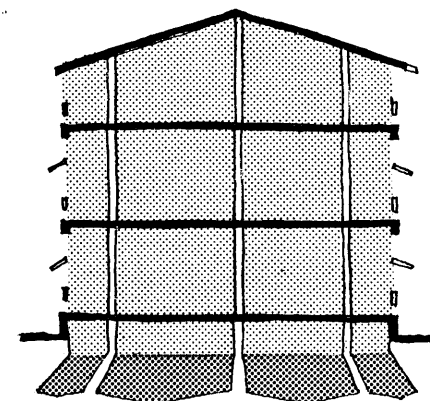
COR



BAL RM 1 RM 2 COR



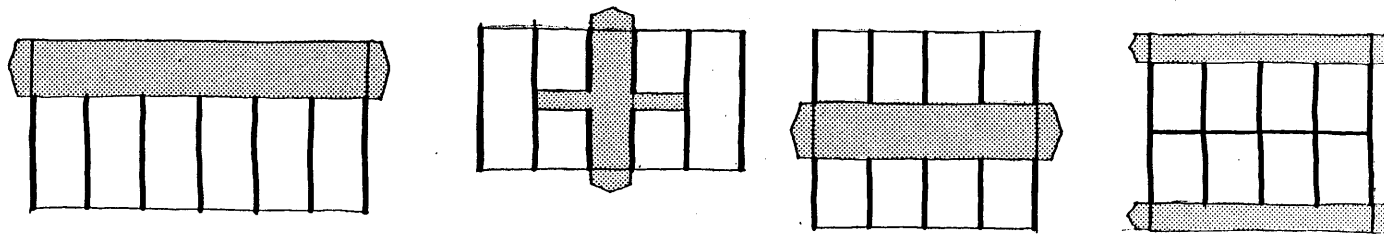
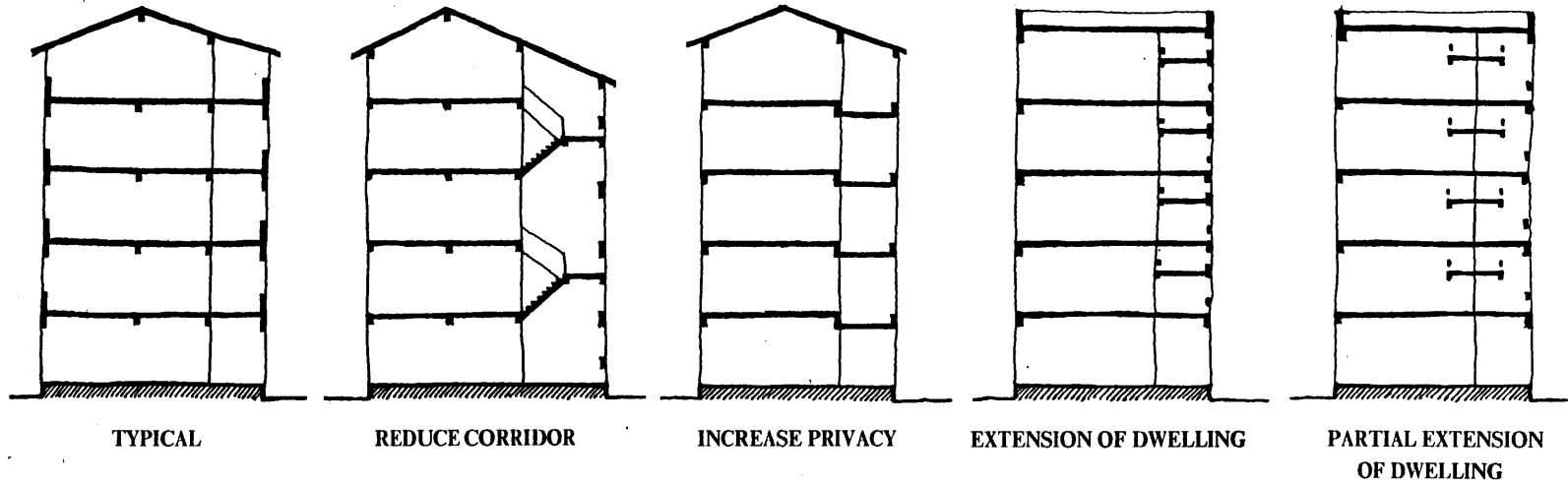
BAL DW 1 COR DW 2 BAL



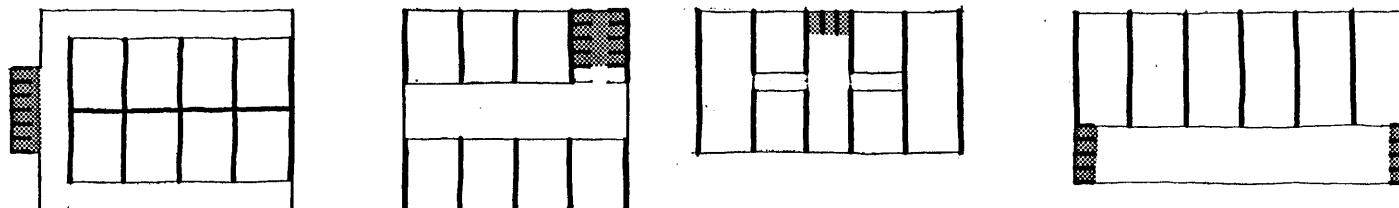
COR DW 1 DW 2 COR

GENERAL OBSERVATIONS

CORRIDOR - DWELLING UNIT MODELS

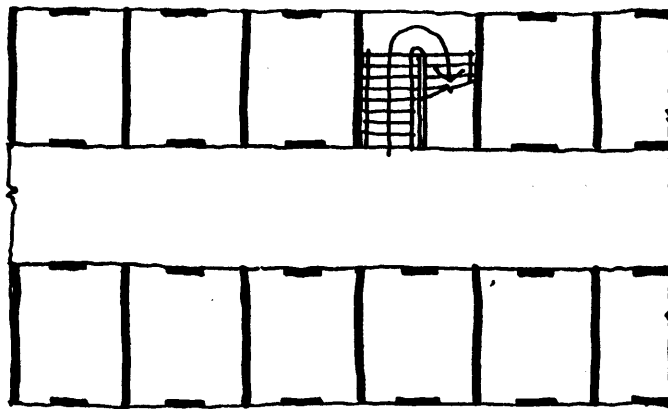
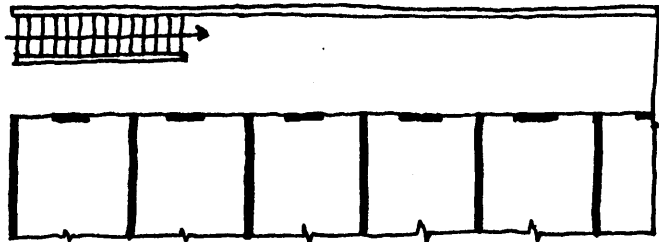
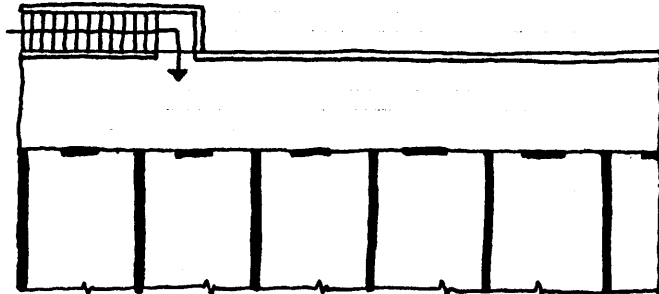


COMMON SERVICES MODELS

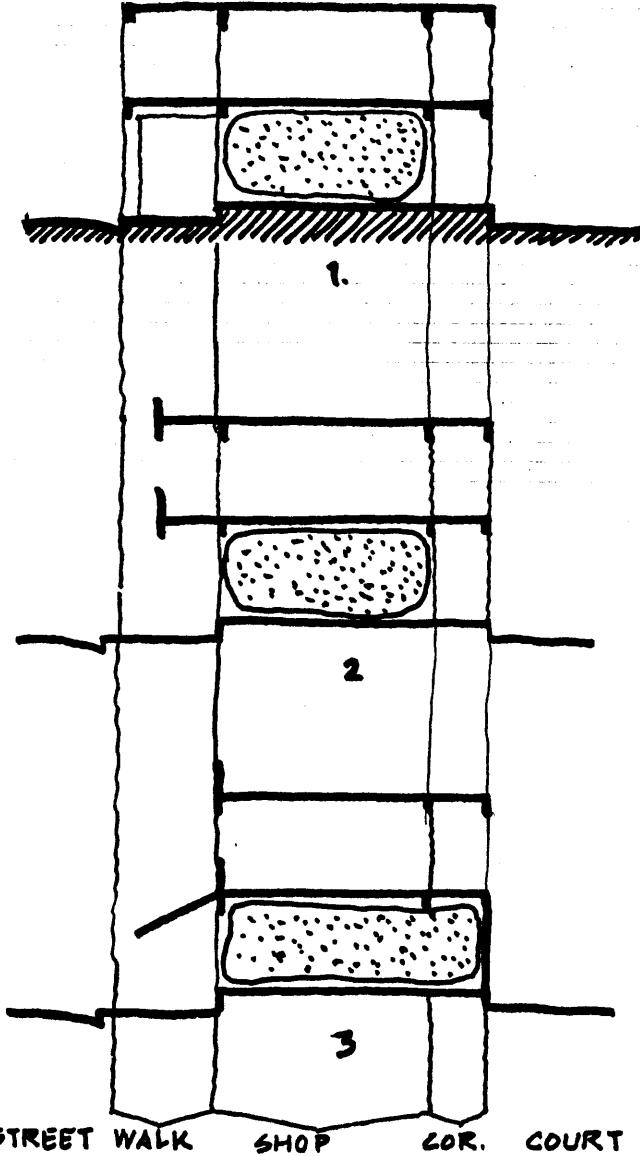


GENERAL OBSERVATIONS

STAIRCASE BLOCK - 4 MODELS



SHOP - MODELS



GENERAL OBSERVATIONS

- Urban pattern very dense
- no setback on primary streets
- Continuous facades allowed for covered walkways
- No pedestrian alleys - chawls used as cut-throughs
- Peripheral layout allows bigger enclosed open spaces
- All streets have vehicular traffic
- Courtyard only open space in the vicinity
- Greater use of enclosed courtyard
- Access to chawls from all streets abutting it
- N-S orientation of dwelling units - all do not follow this rule
- First floor of chawls always has commercial activity - they occur even inside the courtyard
- Height of chawl varies from a single to five storeys
- All structures are timber and brick or reinforced concrete and brick
- All dwellings have wash-places - sometimes converted into bathrooms
- Change in the form of lofts within the dwellings
- In case of single room tenements with balconies, the tendency is to enclose the balconies and convert them into kitchen
- The corridor is often used as a space for drying clothes, storage or sleeping

ISSUES

Undoubtedly, the chawls have serious problems today, the importance of which is strong enough to lead anyone to outright rejection of the type at the first instant. However, by careful analysis one finds that the problem has never been with the form of the type. It is in fact the capacity of the chawl-form to accommodate high densities (which was the prime requirement then and is even now) that led to its inception. even though believed to have been the product of industrialization of Bombay and the massive population explosion brought about with it, chawls privately developed were not replicas of western models. Instead the chawl comprised of elements that was very much a product of the local socio-cultural context. Curiously enough, it was the government who replicated the western model used for the workers (and often a poorer version of it due to constraints of greater densities) in preference of the local model adopted by the private developer. The problem is overcrowding - from what was originally intended as single person tenements, each tenement in a chawl today houses at least 5 - 6 persons on an average, leading to severe space constraints and infra-structure breakdown. In this light if the type (or any type for that matter) is to be adopted, the issue of growth and change most definitely forms a key one that needs to be dealt with in detail - the capacity for the dwellings to change commensurate with the change in user needs and the infra-structure to develop in time as the housing process unfolds.

When the chawl was developed originally, the phenomenal influx of commercial activity was totally unenvisioned. Today the residents are under tremendous pressure as the chawls keep being increasingly invaded by offices and shops and land values keep soaring astronomically. From what was originally intended for being used as a courtyard, today has become a

thoroughfare with vehicular intrusion and a place for loading and unloading for the shops below. Again due to pressures like the ones mentioned and increasing speculation, a homogeneous composition of resident group can no longer be assumed. In lieu of the present situation the issue that comes to limelight is one of territoriality dealing with aspects of control (who controls what) - their level, extent and means along with aspects of security, identity and activity that are all interlinked. Again, the potential for maintaining privacy should a resident so desire and at the same time retaining the intra-chawl interaction that exists till date needs to be included in the scope of such explorations.



Building regulations and standards inevitably constitute one of the key issues, partly due to the ineffectiveness of them in the past and partly due to my own emphasis on user planned environments. The existing standards cannot be appropriate for user planned environments, simply because they are meant for the situation today where the user plays no part in the building activity. The changes that I shall attempt suggesting are those aspects of regulations that crop up from other issues that I deal with.

Given a site, the selection of an appropriate model based on the characteristics of the site, forms an important design decision. Criteria for selecting a model given the characteristics of a site therefore becomes another important issue that I intend tackling.

The problem of overcrowding can also be interpreted at another level as being a problem with high densities. Stipulating densities and FAR for a particular area involves a major planning decision, given the need for accommodating high densities and avoiding overcrowding. At the design level, ways of manipulating the structure to accommodate stipulated densities constitutes an important decision. This requires an understanding of the elements of a chawl that govern densities.

One major factor that makes chawls the most viable form of housing is that it still falls within the affordable range of the low income group. It is of primary importance therefore that one realizes the factors that make the chawl affordable (both for the user as well as the developing agent). The capacity of the chawl to accommodate families with varied degrees of affordability needs to be explored. Similarly, the potential for the chawls to be affordable for the developing agent also needs to be explored.

PART II

THE DESIGN

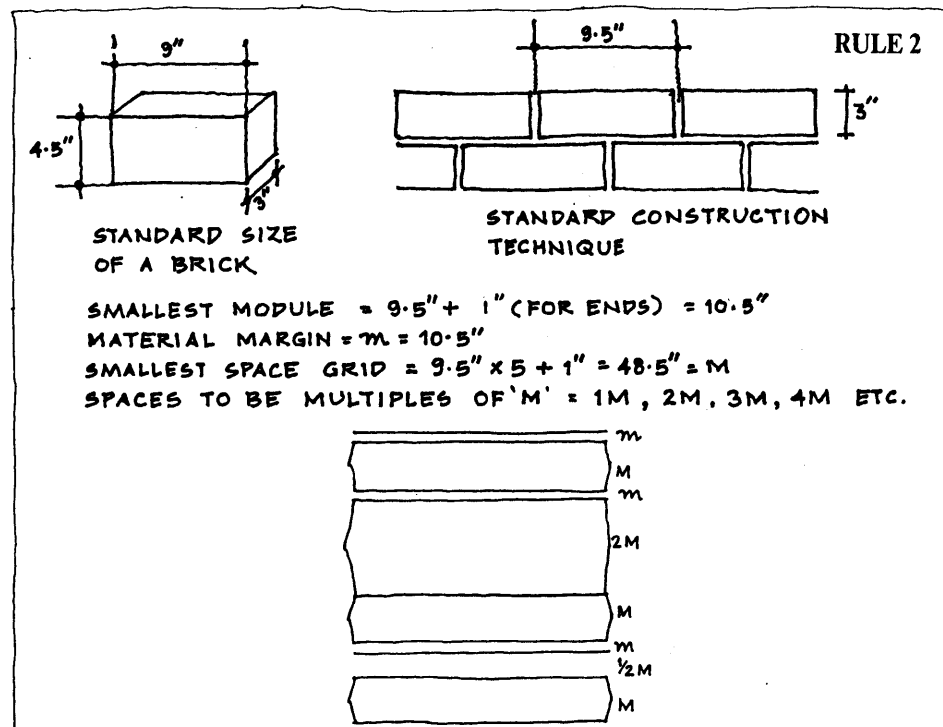
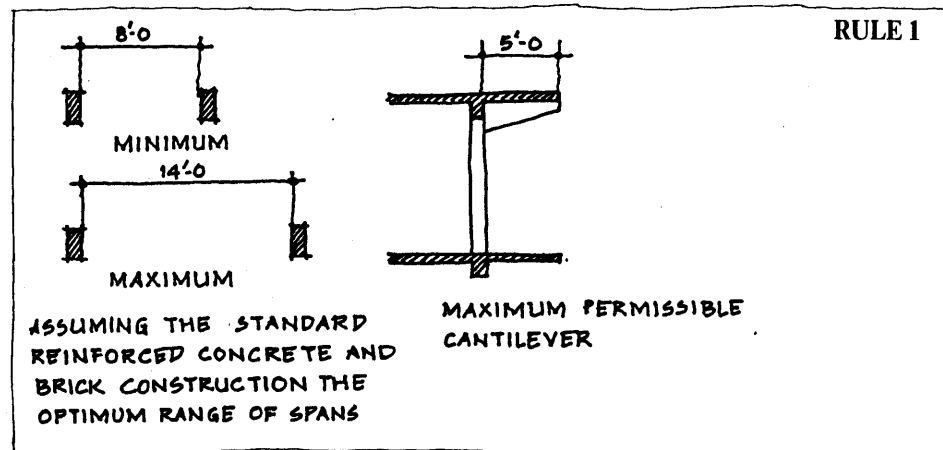
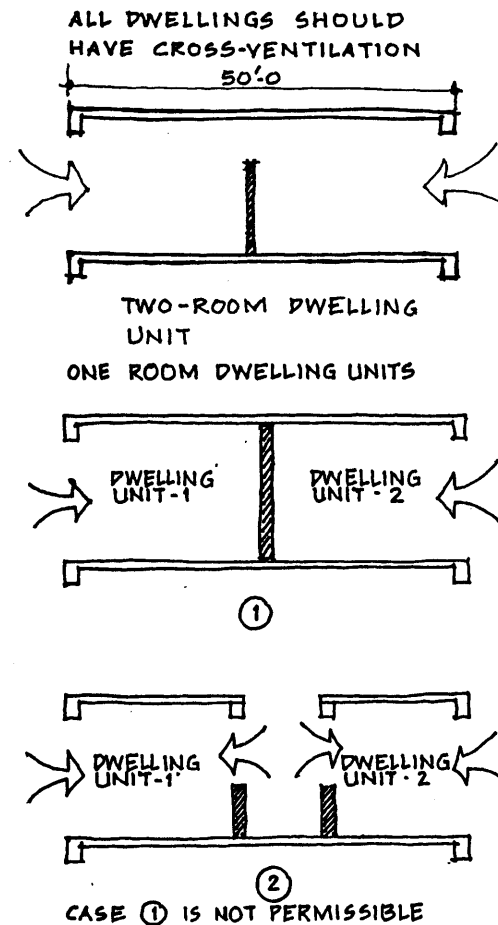
The process is conceived along the lines of evolutionary housing strategy. Broadly speaking, the strategy rests upon two basic criteria :

- Entitling individual families the right to shape their own dwellings, according to their requirements, choice and priorities, within a general framework of reference agreed upon by the parties involved , which in turn acknowledges the potential of the residents community to engage in a joint effort with the sponsoring agent.
- Incorporating time as a substantive component into the act of designing. In terms of making the necessary provisions for the dwelling to be developed gradually as the housing process unfolds, according to the emerging changes in needs from the standpoint of the households. This approach is adopted for a couple of reasons. First of all, the structure of households in the context have been observed to change radically in time. Hence, given the necessity for the dwellings to be small, the problem of space and infrastructure restrictions are inevitable if the dwellings cannot grow in time. It is therefore not surprising that the idea of providing finished houses has always failed in the past. The other important reason that makes this strategy more realistic is that the resident group in most cases is not able to afford finished houses and neither can the developing agent provide them with affordable finished houses because it becomes too expensive even for them. Therefore it is only more logical to pursue a strategy whereby the developer has to build less so

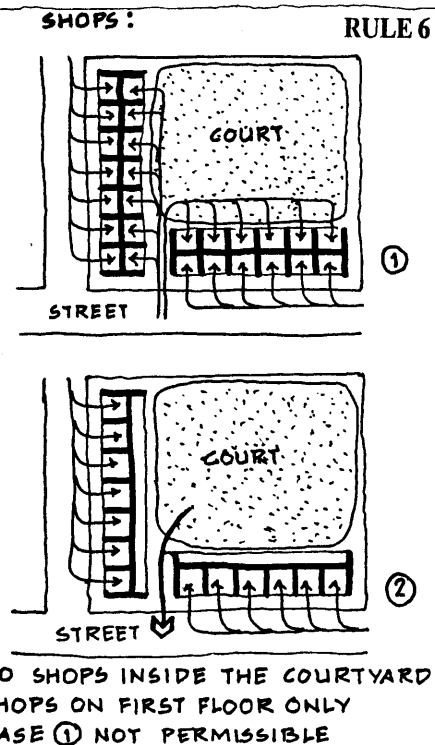
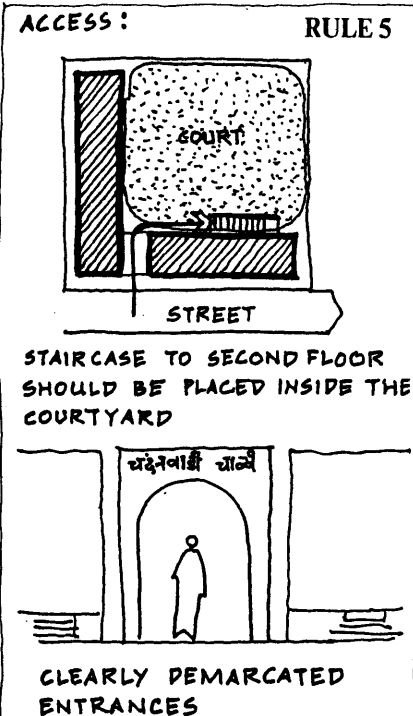
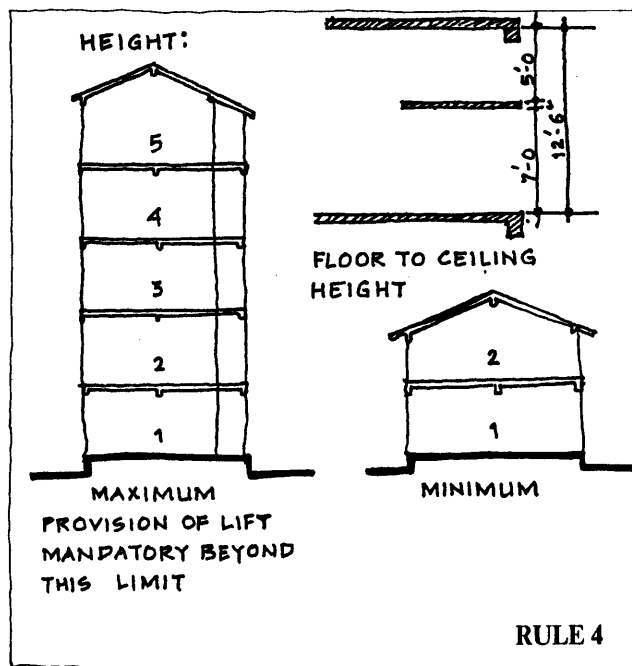
that both the user and the developer can afford it and the user can add more as and when required. Change in respect means an additive process in principle as any change involving demolition implies extra unnecessary capital and wastage of materials as well. Evolutionary housing strategies do not consist merely of predetermining growth sequences but a fair flexibility for morphological as well as for physical development options.

- The models are also conceived as being flexible enough so as to be applicable in pockets of existing well located but dilapidated areas, still capable of yielding high densities while allocating substantially larger habitable space per dweller as well as be applicable in cases of new developments.
- Since the idea is to promote mixed income development, as premises for design I have assumed all types of dwelling units to be accommodated. By all types of dwelling units I mean single, double or even more than double room units. This however need not necessarily be the case and hence cannot be accepted as a rule.
- I have assumed that the chawl has to be developed for a heterogeneous group of people, since as observed earlier, it is highly unrealistic to presume a homogeneous composition of resident group.
- Commercial activities has been accepted as a basis because I think it is essential to make provision for them in the chawl, to retain the existing vitality of the areas.
- I have also assumed that the chawls be developed as a high density solution, because the idea is to test the potential of the form in providing high densities and an agreeable environment

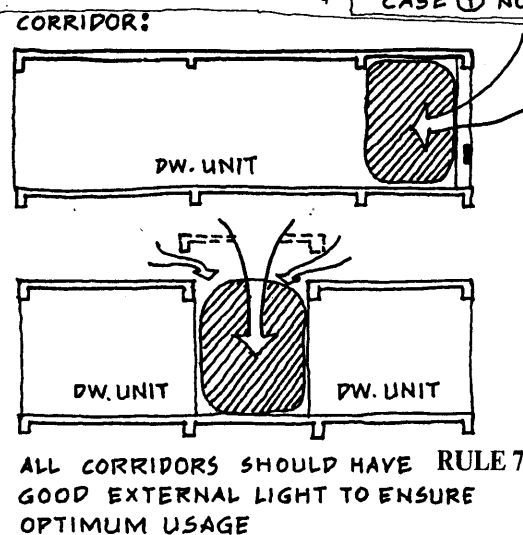
RULES

**RULE 3**

NOTE: IN CASE OF ONE ROOM TENEMENTS, THE RULES FORMULATED DO NOT CORRESPOND TO EXISTING BYE-LAWS WHEREIN CASE ① IS PERMISSIBLE



DIMENSIONS		
ELEMENT	MAXIMUM	MINIMUM
CORRIDOR	12'-0"	6'-0"
BALCONY	4'-0" x 12'-0"	2'-0" x 8'-0"
RM 1	16'-0" x 12'-0"	8'-0" x 8'-0"
RM 2	16'-0" x 16'-0"	12'-0" x 10'-0"
COMMON SERVICES RATIO / DWELLING	1 FOR EVERY DWELLING	1 FOR EVERY 4 DWELLINGS
TOILET	4'-0" x 5'-0"	3'-0" x 4'-0"
BATHROOM	5'-0" x 5'-0"	3'-0" x 4'-0"
WASHPLACE	3'-0" x 3'-6"	2'-6" x 3'-0"
MAIN ENTRANCE	2 DW. UNITS	4'-0"
STAIRCASE	4'-0"	4'-0"
MEZZANINE AREA	12'-0" x 8'-0"	3'-0" x 8'-0"
HEIGHT	5'-6"	3'-0"
SHOPS	12'-0" x 35'-0"	8'-0" x 20'-0"

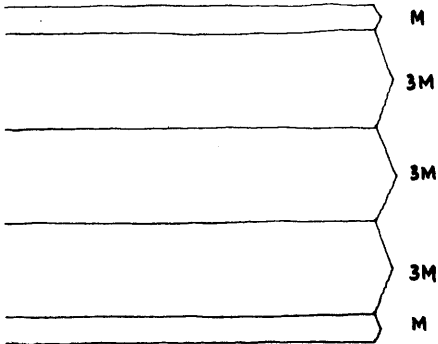
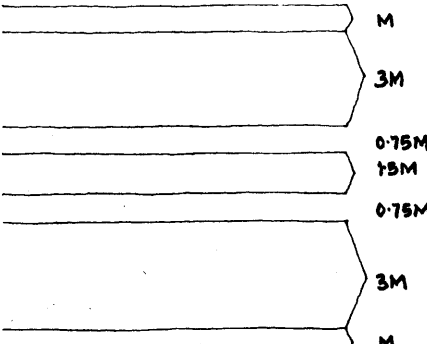
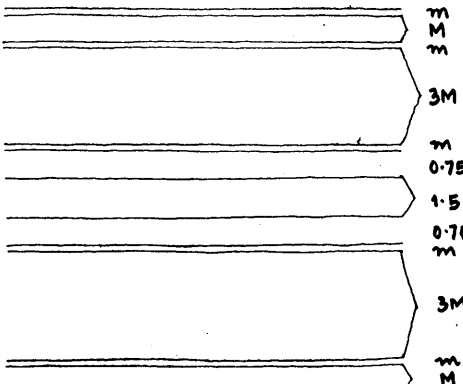
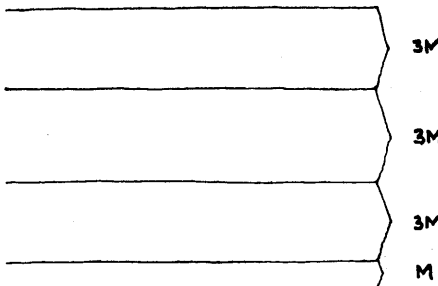
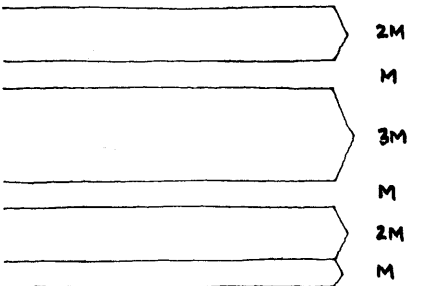
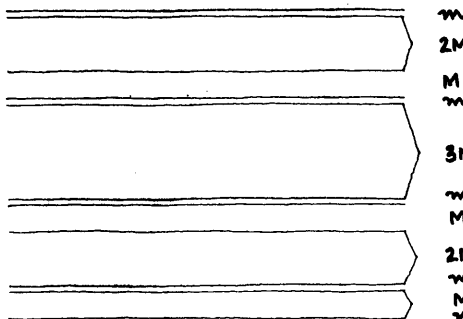
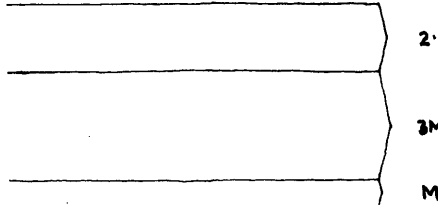
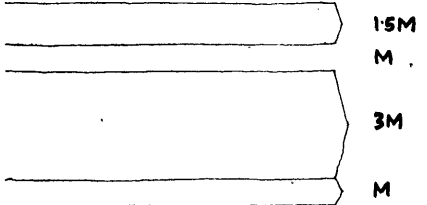
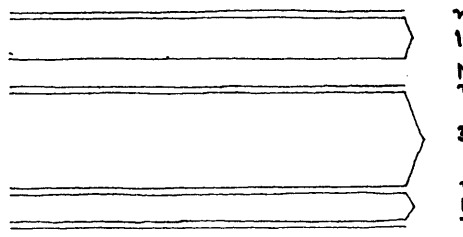


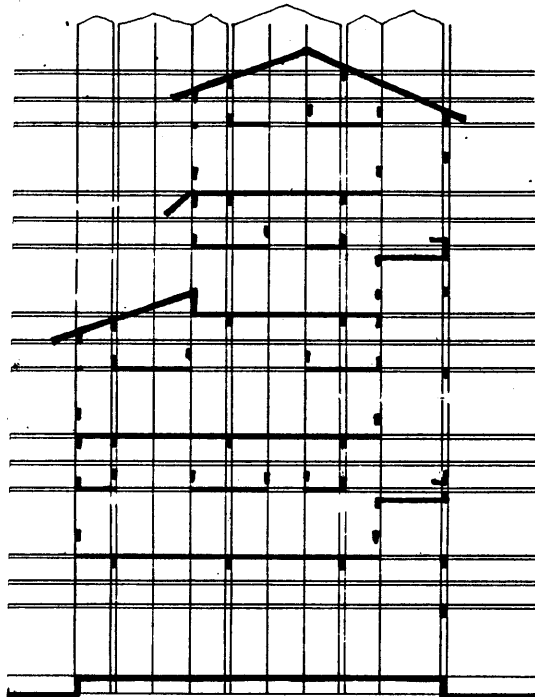
PENSITY: RULE 8

200 DWELLINGS/Ha (MIN.)

300 DWELLINGS/Ha (MAX.)

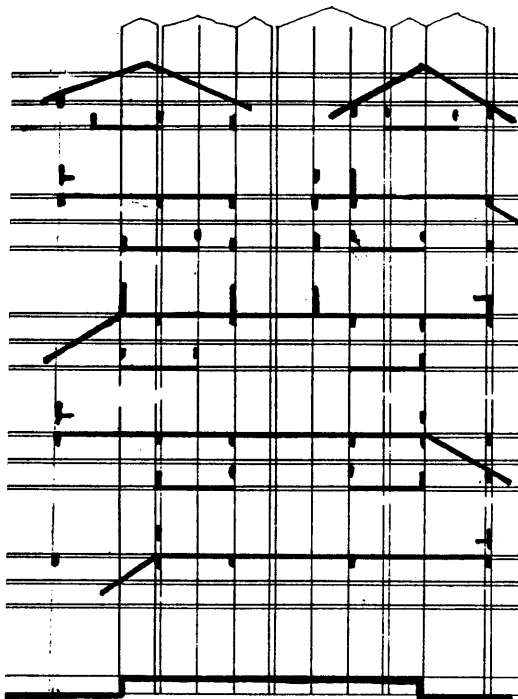
MAJORITY OF DWELLINGS
FOR LOW AND MIDDLE
INCOME GROUPS

ZONE MANIPULATION (In multiples of M)		INTRODUCE MATERIAL MARGINS (In multiples of m)
<p>ZONE DISTRIBUTION</p>  <p>1</p>	<p>IDENTIFY MARGINS</p>  <p>1A</p>	 <p>1B</p>
 <p>2</p>	 <p>2A</p>	 <p>2B</p>
 <p>3</p>	 <p>3A</p>	 <p>3B</p>



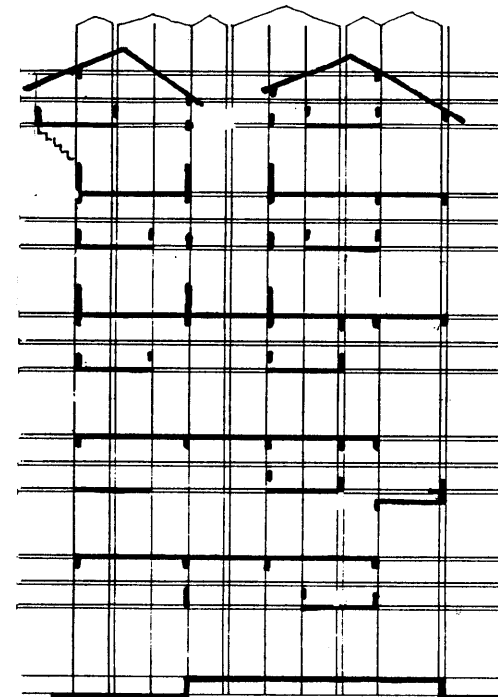
Minimising corridor
Corridor occurring at the
midlanding level serving
as access to two floors

**Staircases needed as access for every
two dwelling units inducing additional
space restrictions**



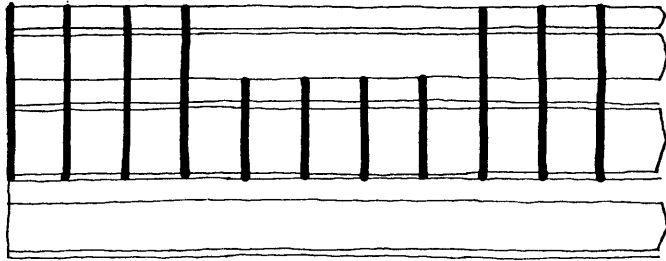
**Introducing an open zone at the higher level to
satisfy cross ventilation requirements for both
dwellings**

Higher density possible



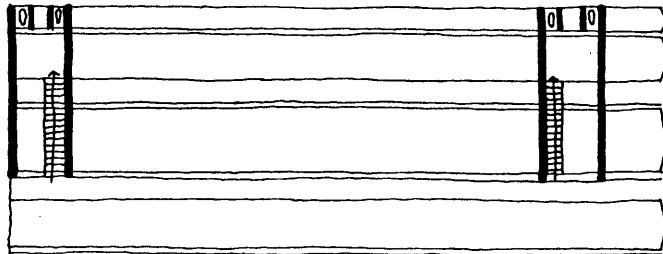
SECTIONAL OPTIONS

COMBINING DWELLING TYPES



COMBINING MODELS

Since maximum distance between two staircase blocks is fixed at 100' 0", staircases and services being specific functions, they form the first design decisions



DETERMINE AVERAGE DWELLING WIDTH

On the basis of capacity of dimension and optimization of structural elements

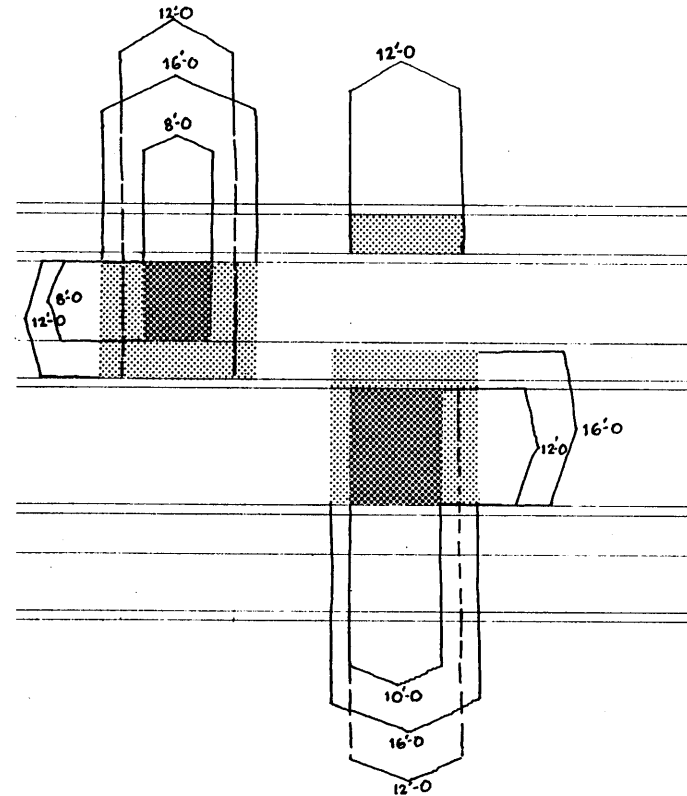
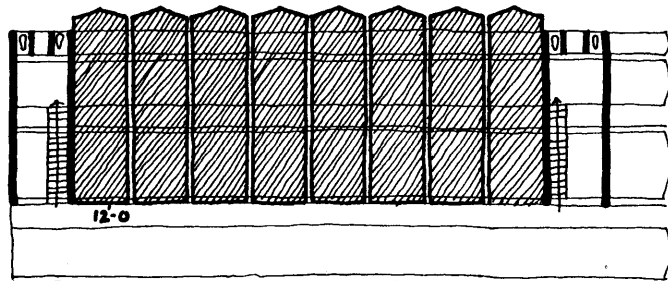
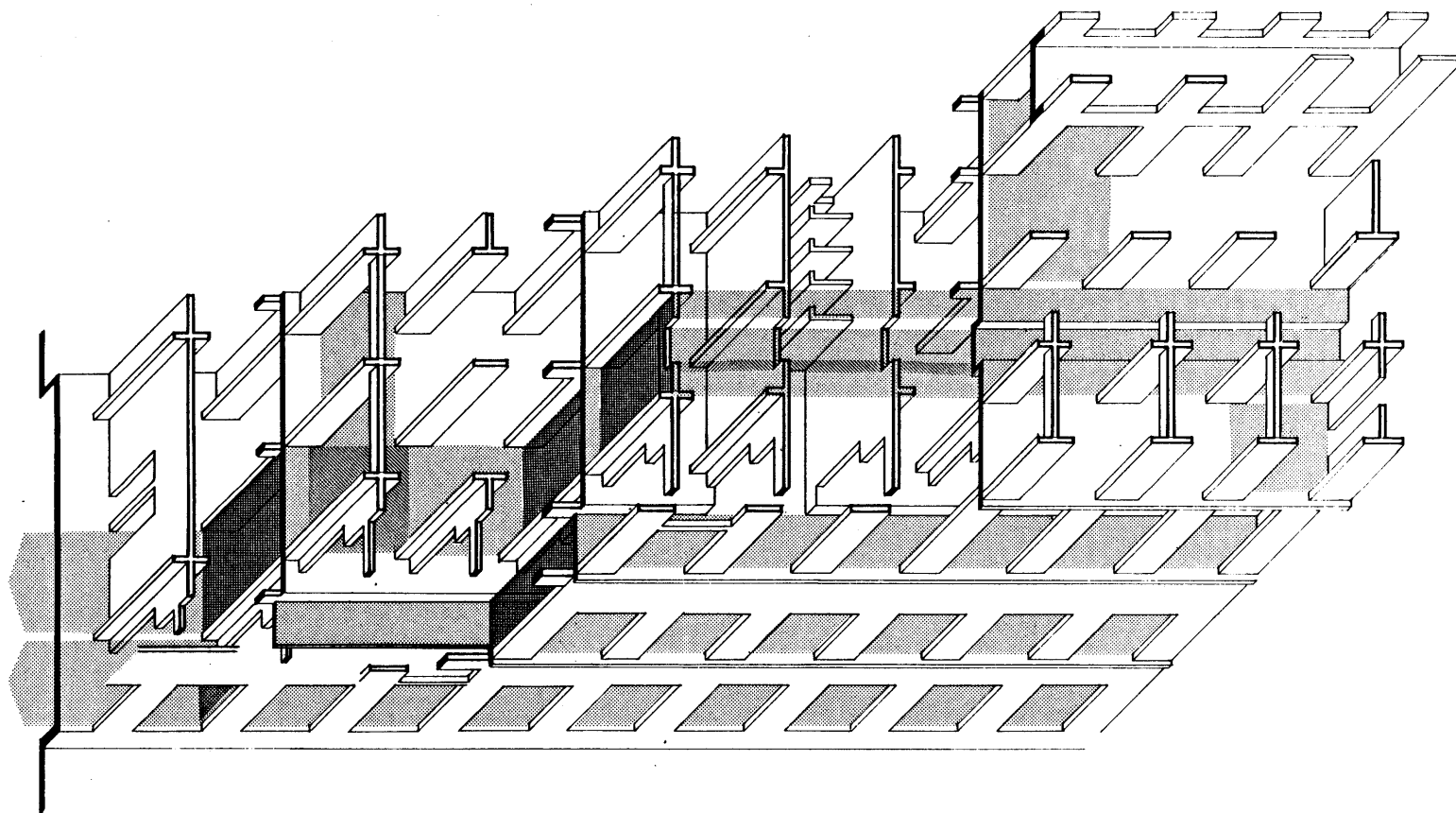
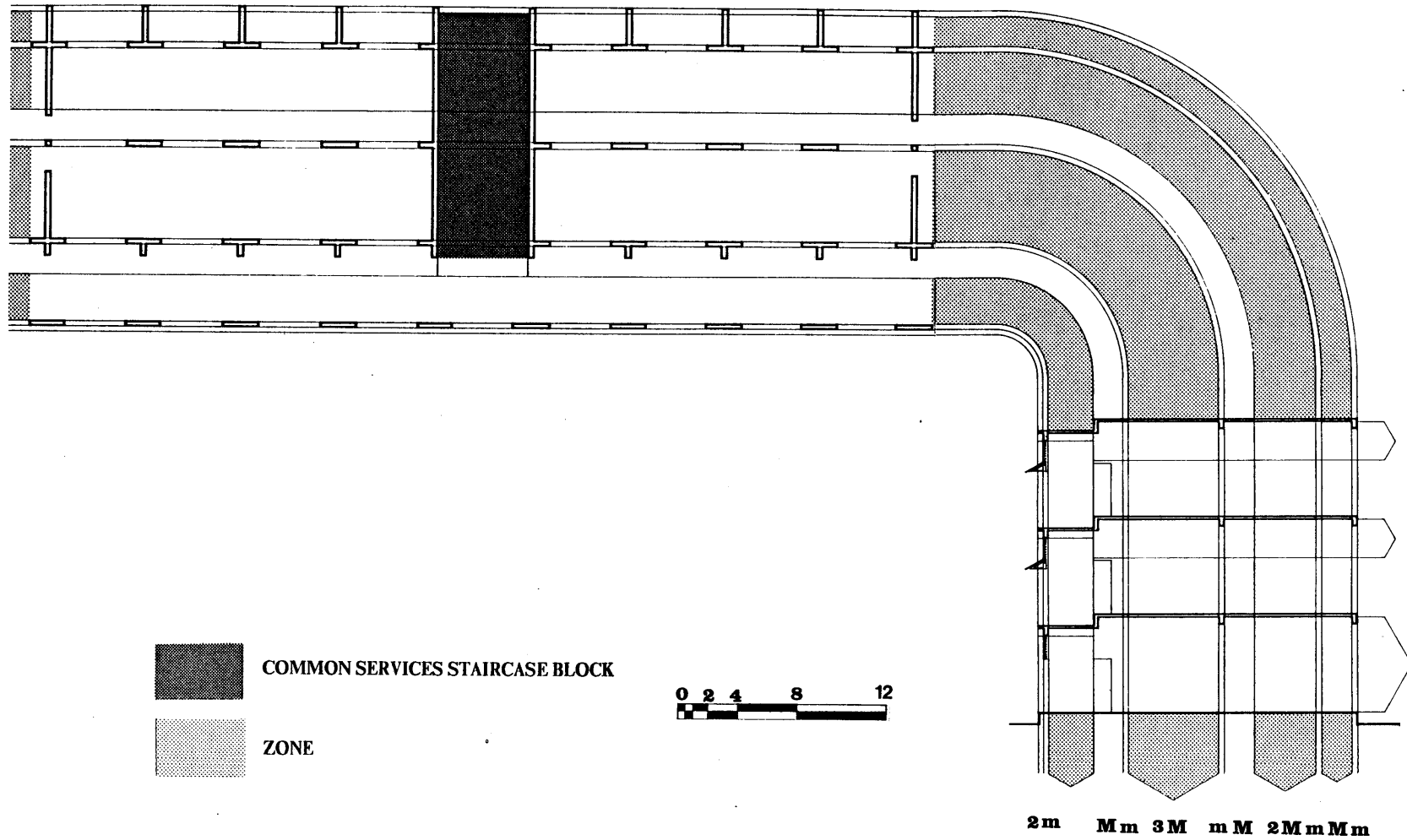


Chart the spaces in their respective zones and demarcate their nature of growth. This determines the sizes of the elements.

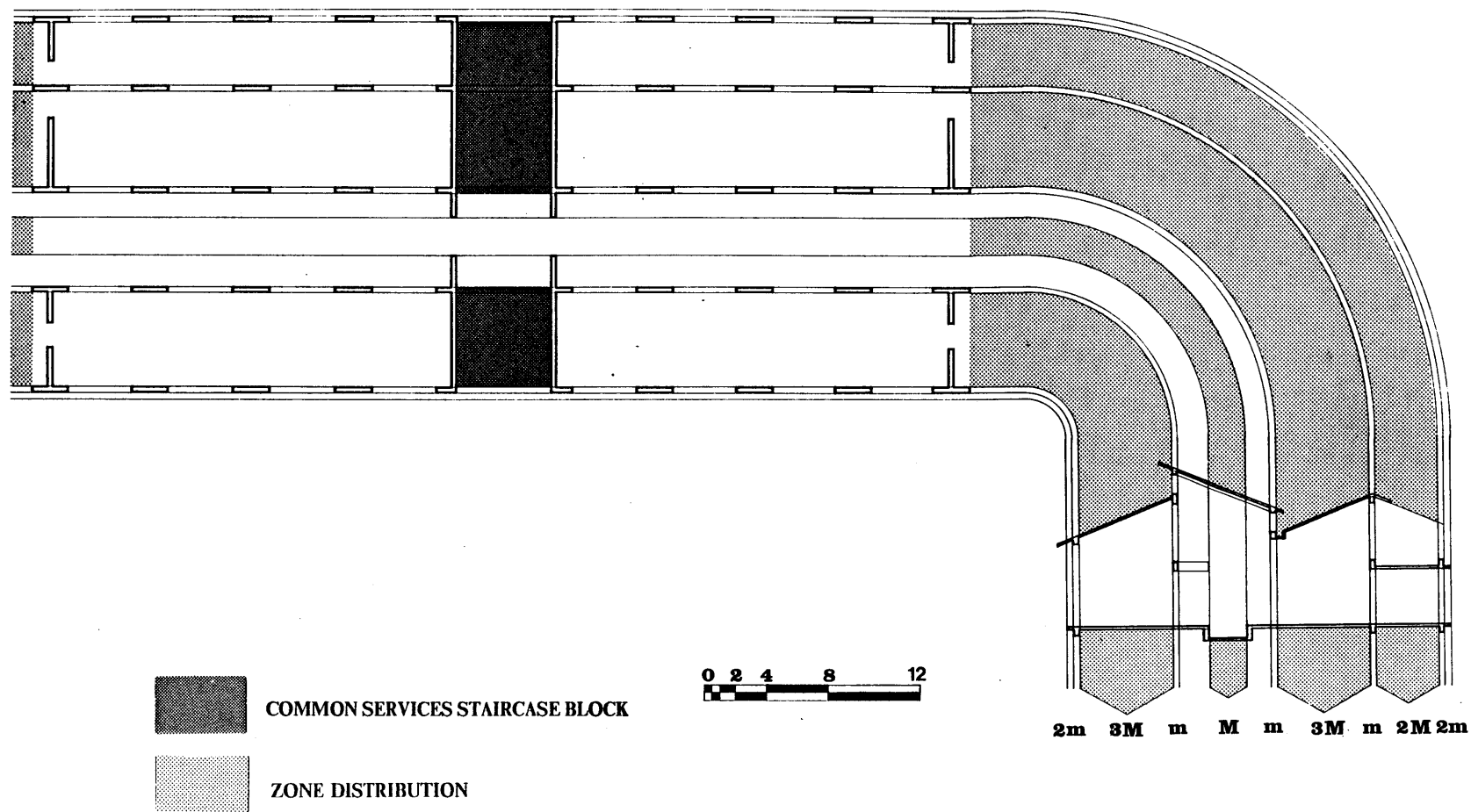
AXONOMETRIC VIEW



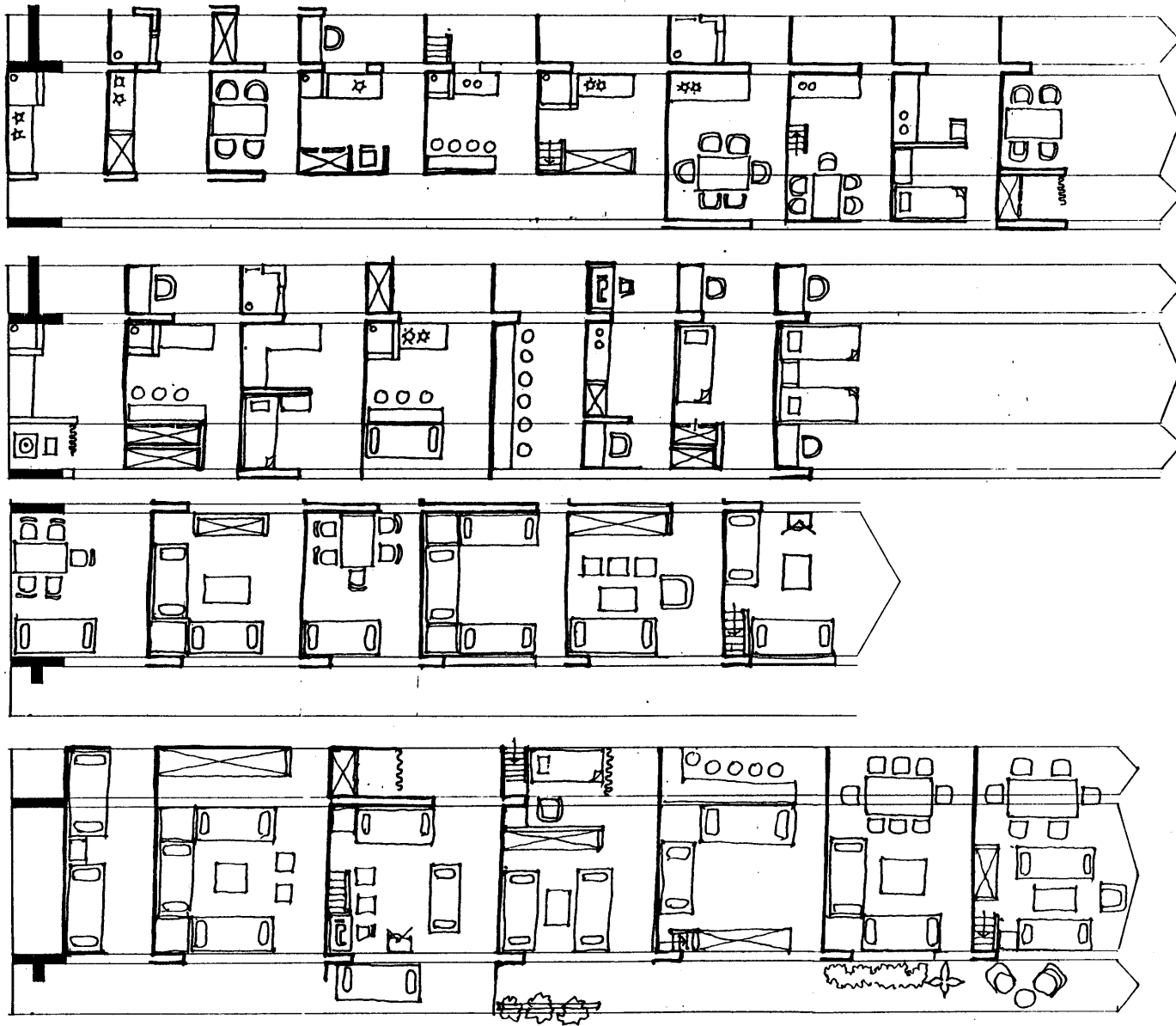
SUPPORTS LOWER LEVEL



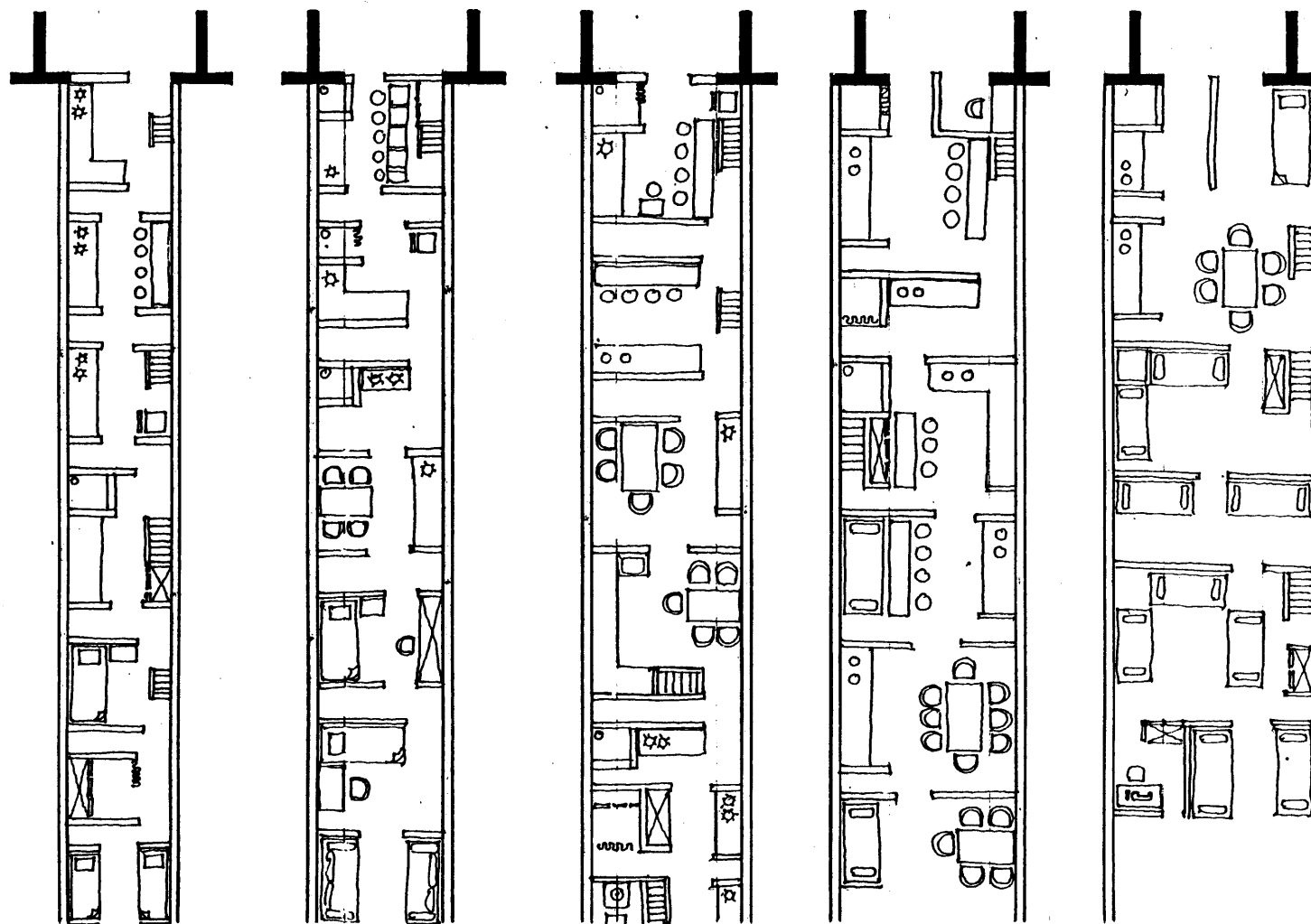
SUPPORTS UPPER LEVEL



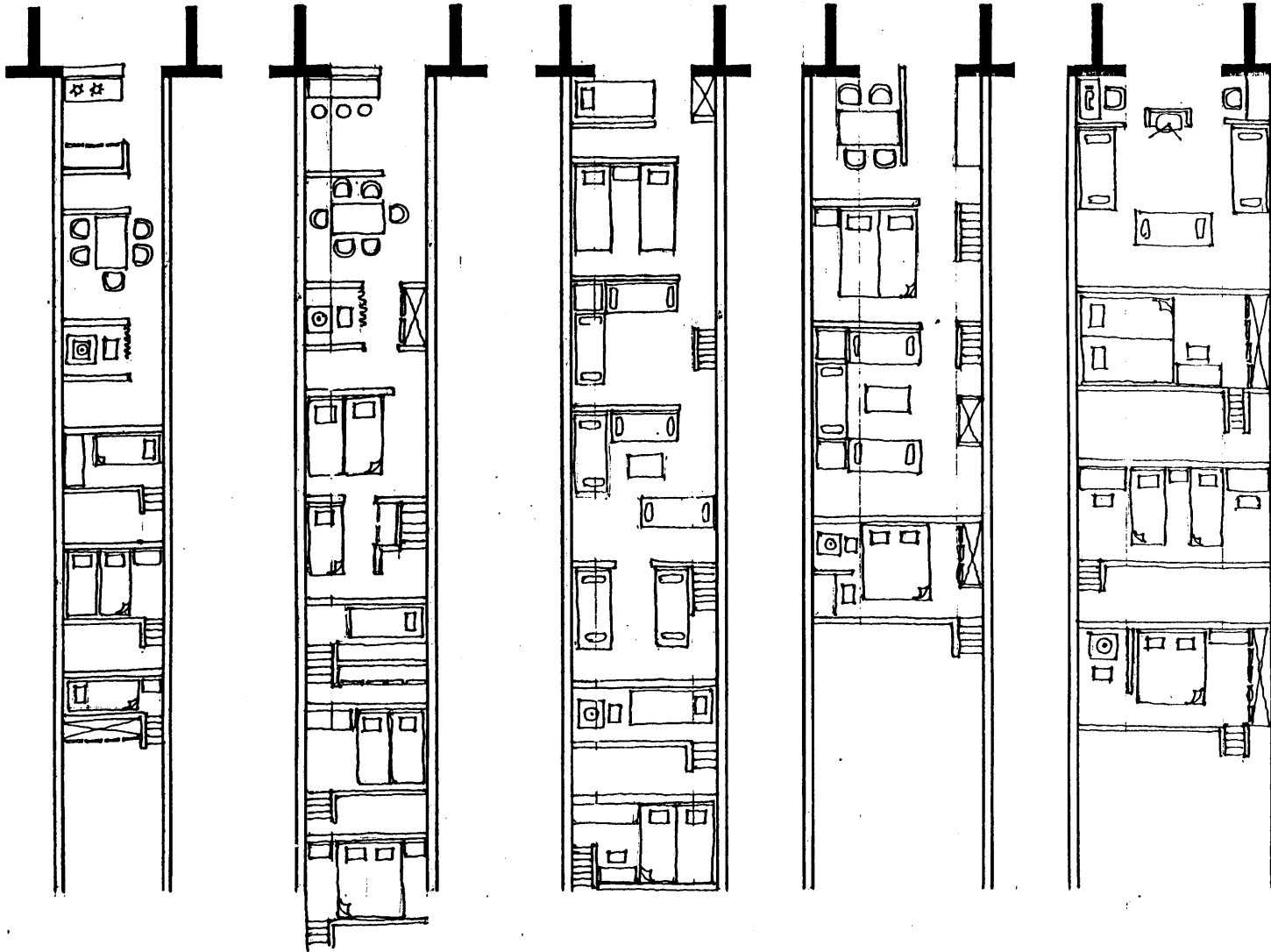
ZONE ANALYSIS



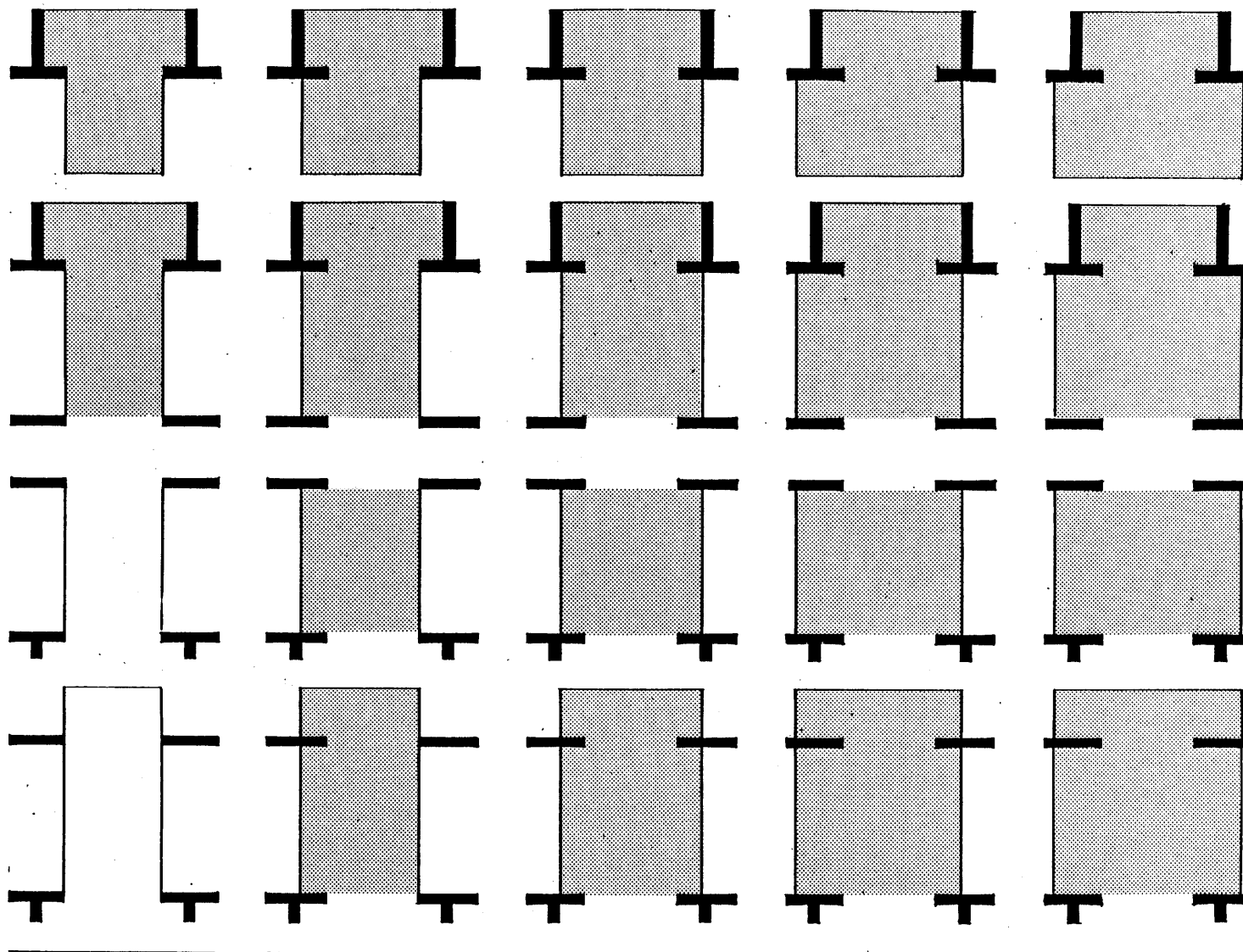
SECTOR ANALYSIS



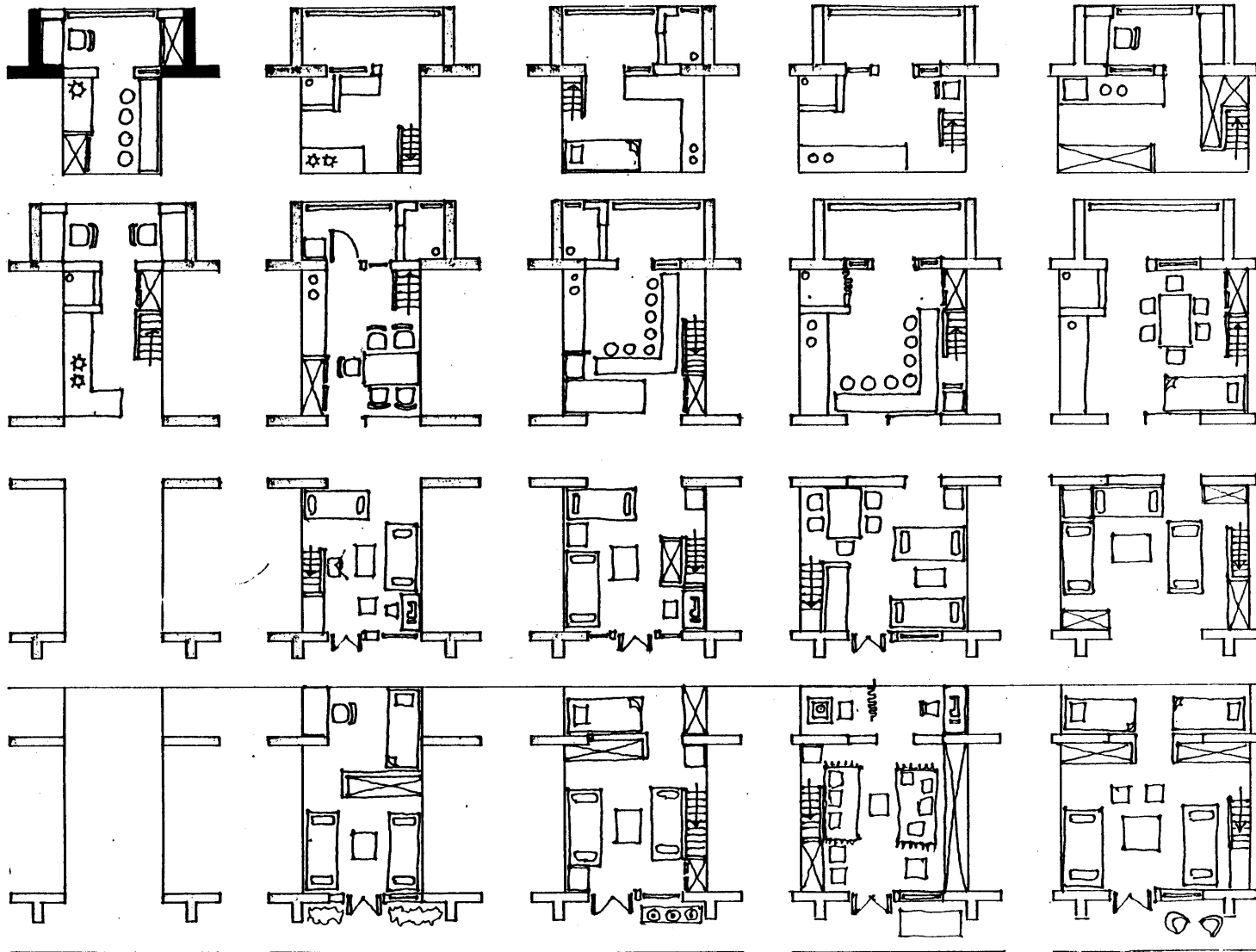
SECTOR ANALYSIS

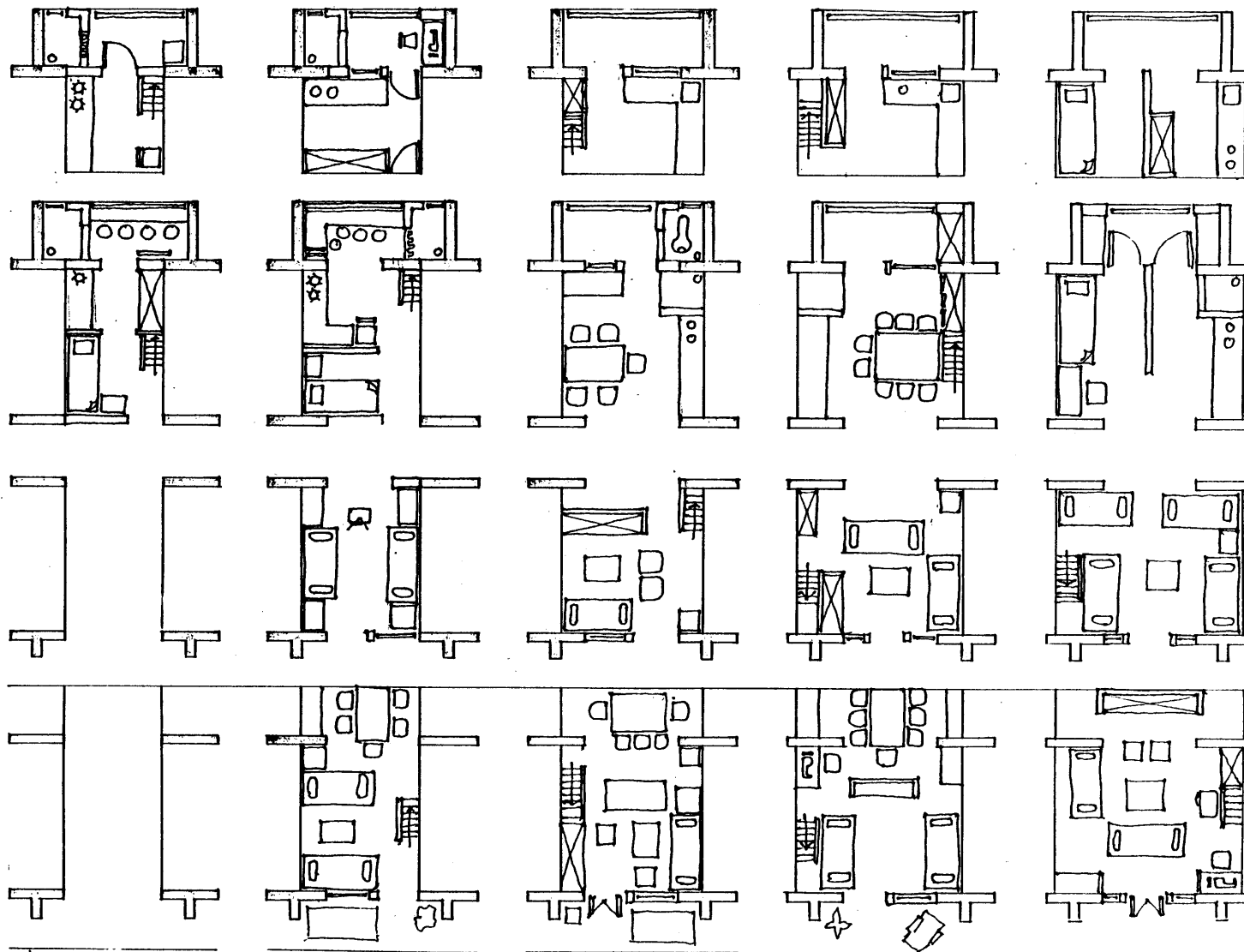


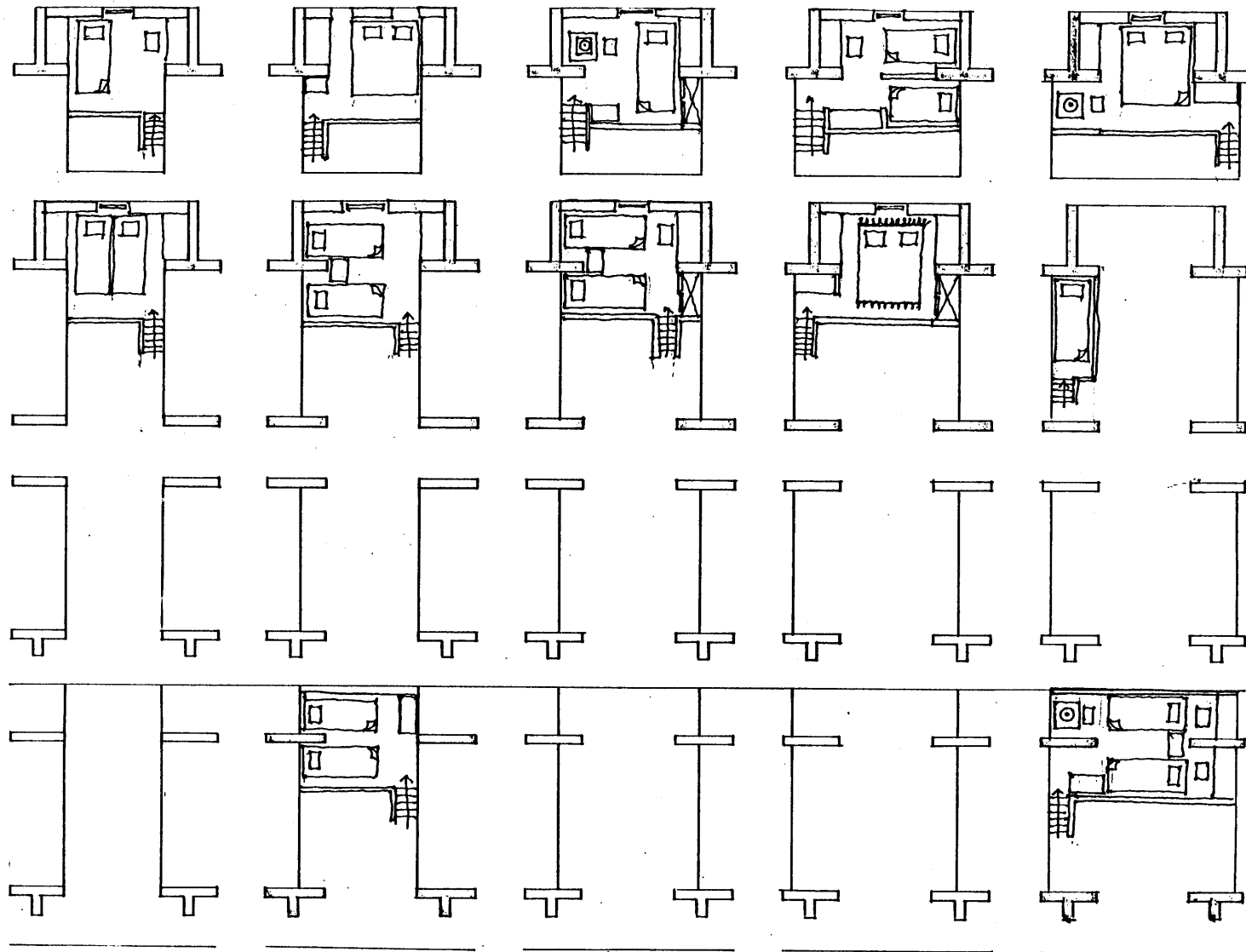
RANGE OF SPACES



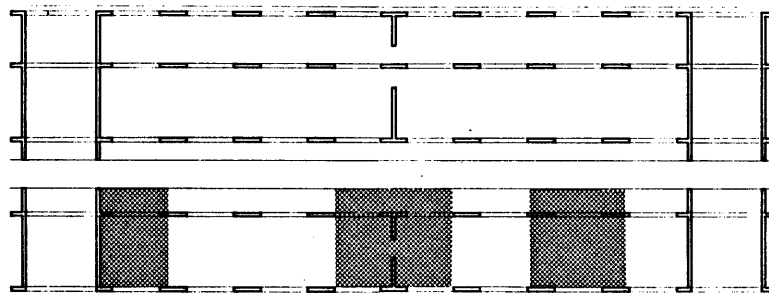
CAPACITY OF SPACES



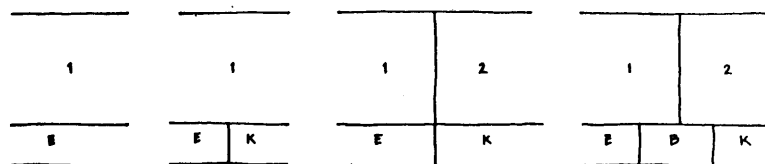




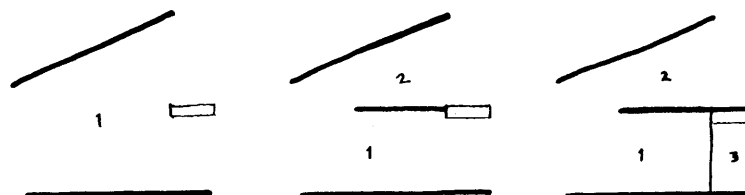
BASIC UNIT



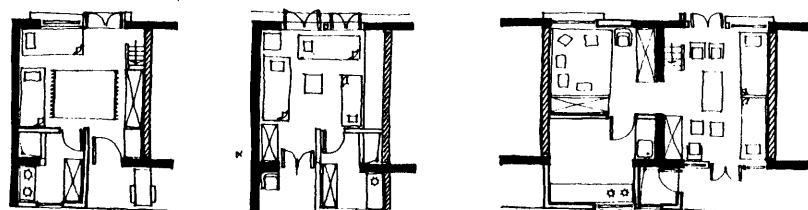
**BASIC VARIATIONS
IN PLAN**

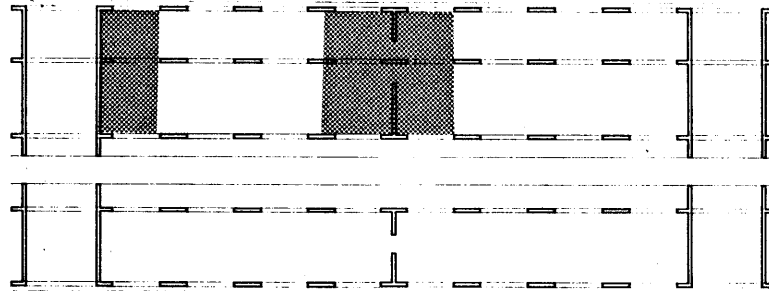
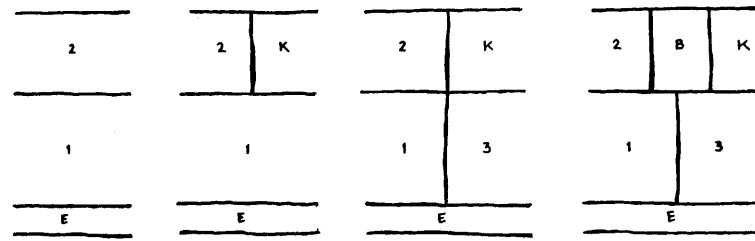
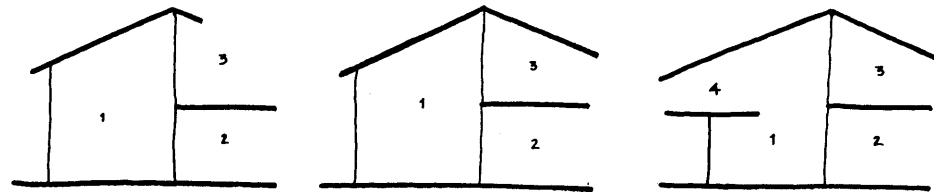
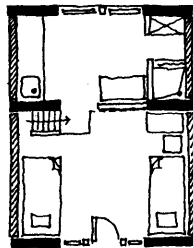


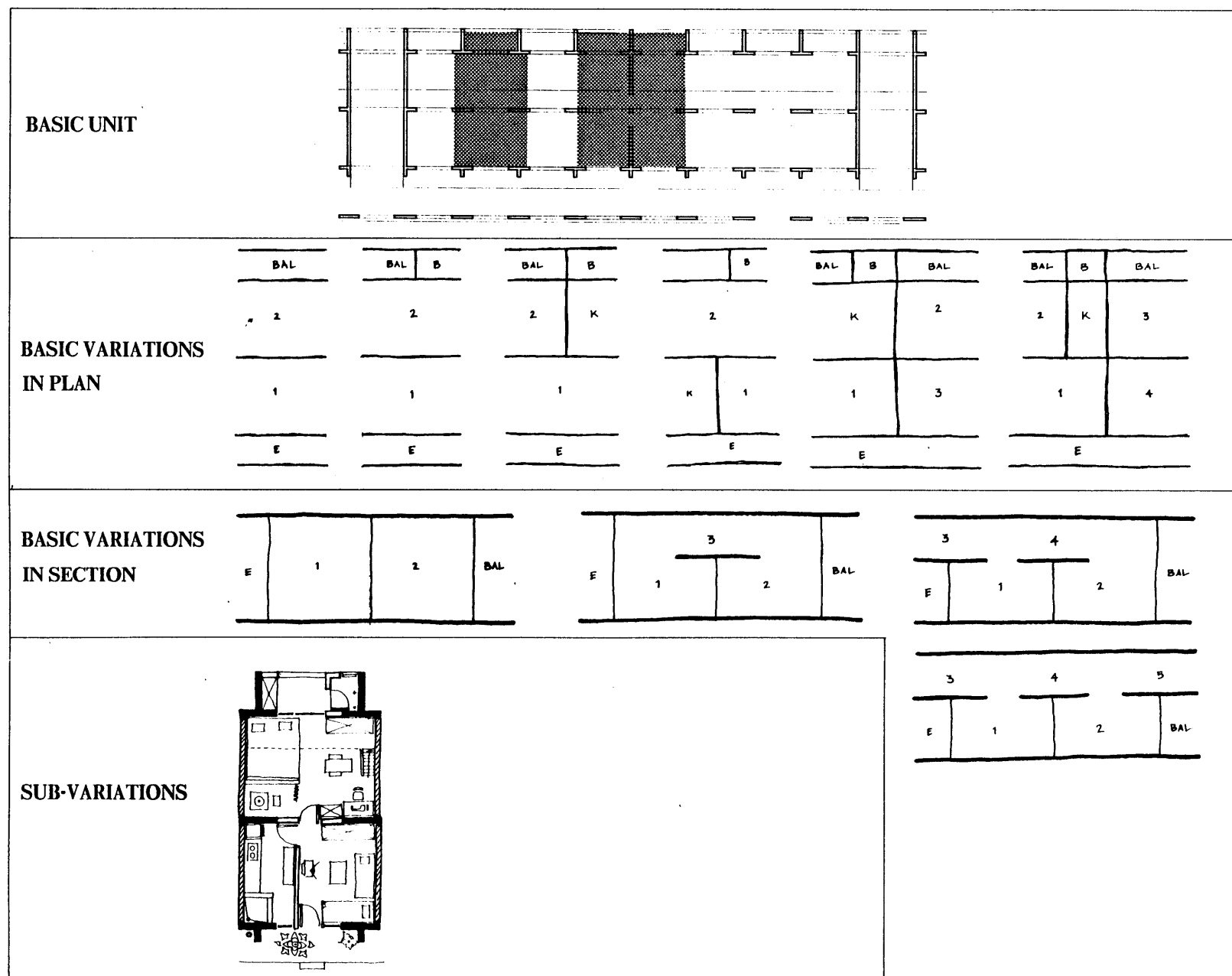
**BASIC VARIATIONS
IN SECTION**



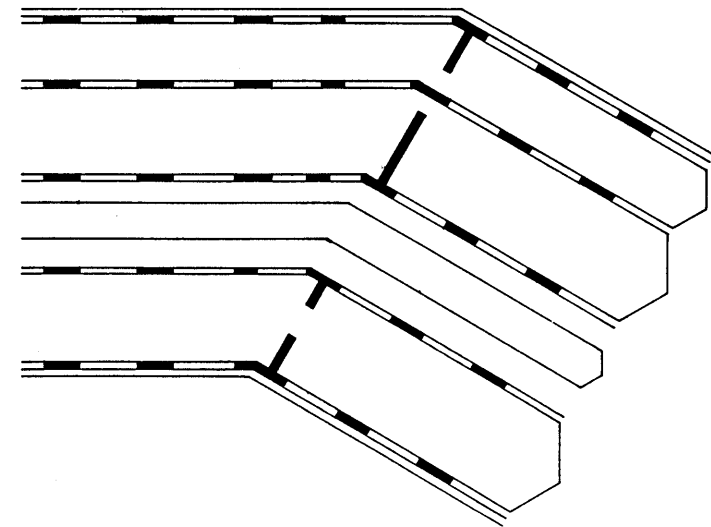
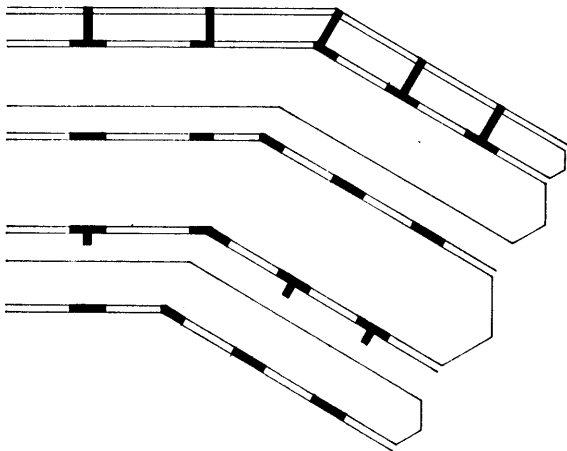
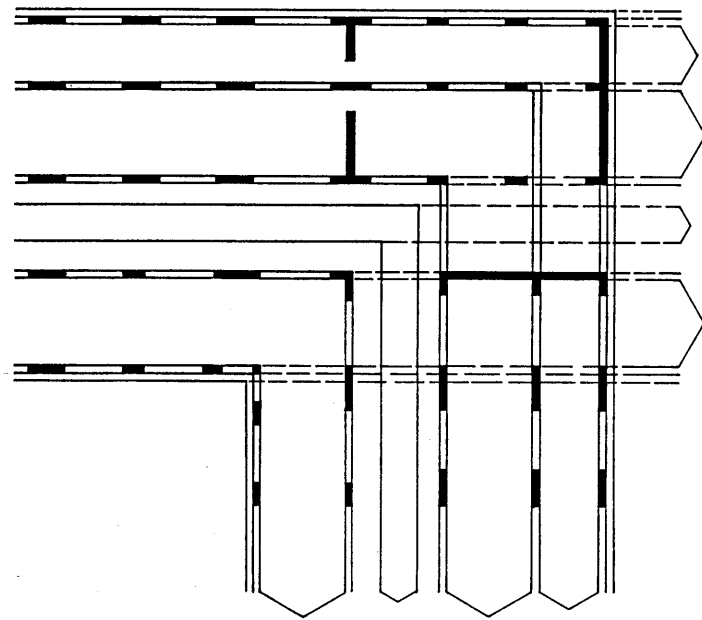
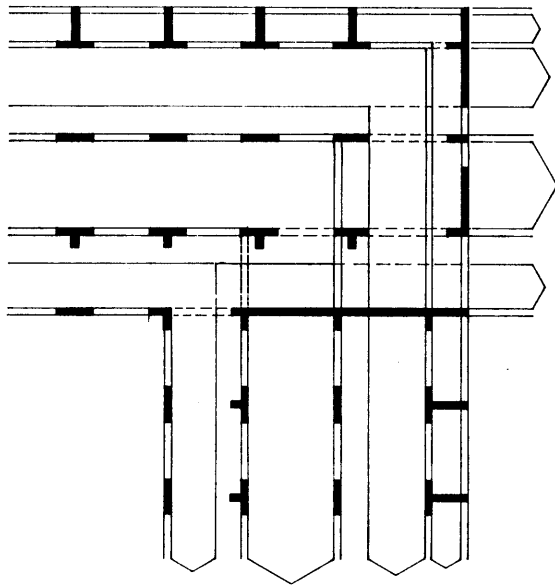
SUB-VARIATIONS



BASIC UNIT**BASIC VARIATIONS
IN PLAN****BASIC VARIATIONS
IN SECTION****SUB-VARIATIONS**



TRANSFORMATIONS



PART III

GROWTH AND CHANGE

The understanding of this issue of growth and change is of paramount importance because it is in fact the major determinant of the nature of support elements. The issue entails an understanding of :

Factors governing change in dwelling use

Changes that occur in family structures through time

The physical implications of accommodating the nature of growth and change

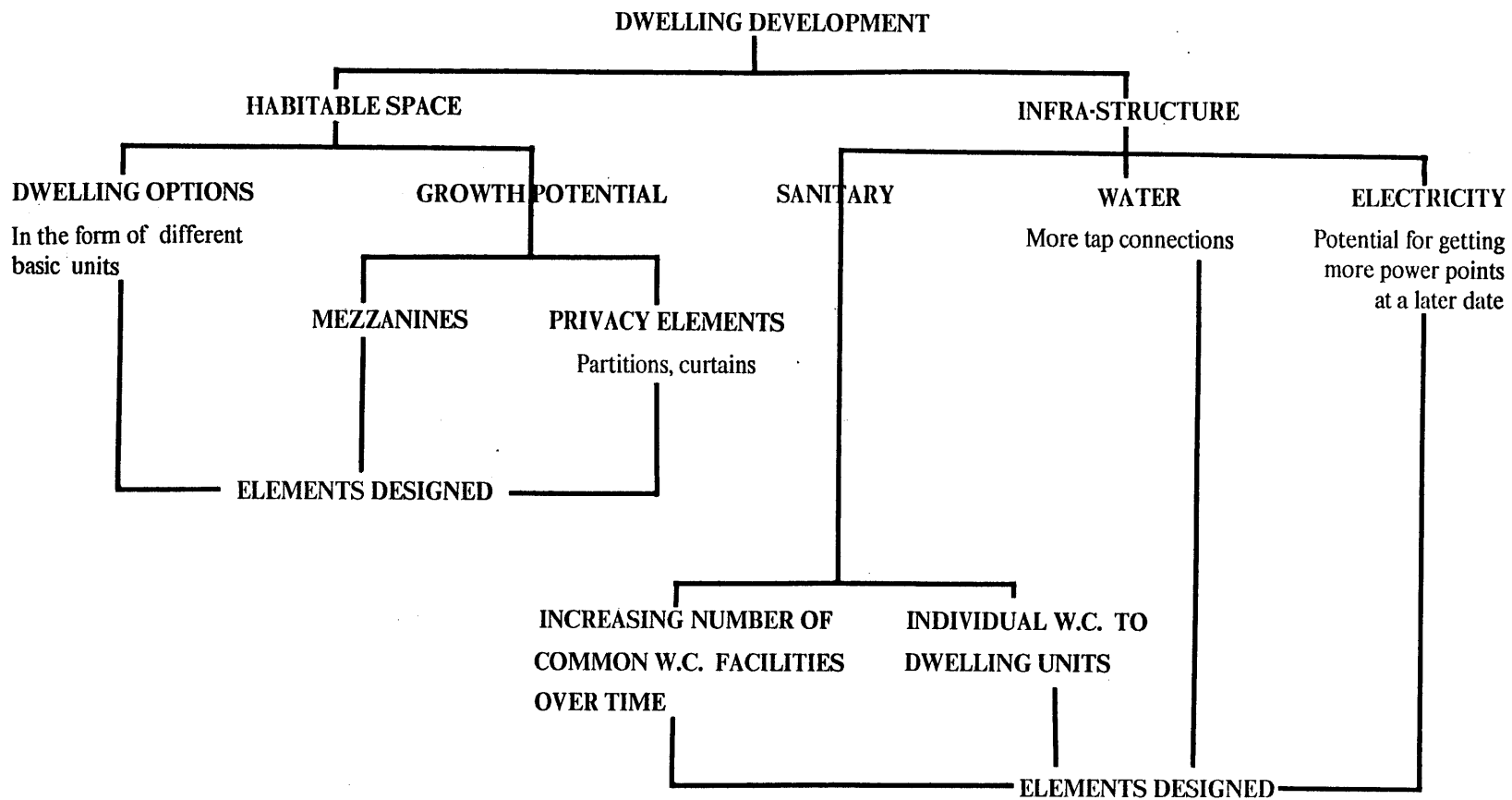
Change occurs in the course of dwelling development essentially due to :

































Increase in affordability - with the same family structure, dwelling development could take place due to the family's increase in affordability. For instance, this could mean an increase in the number of earning members in the family. Change in this situation is usually directed towards improving comfort conditions like - converting a wash place to a bath room, bringing in more furniture, buying a refrigerator etc.

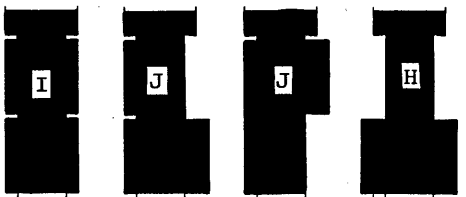
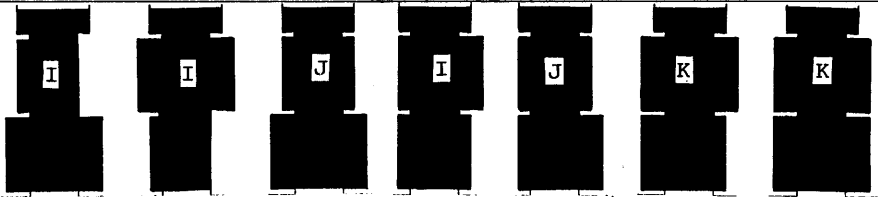
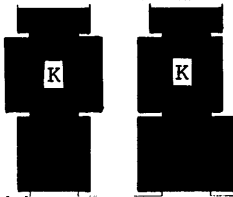
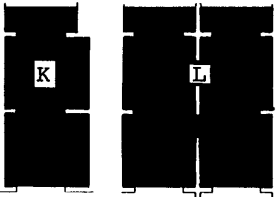
Growth of a family - if the family size increases, change warrants an increase in habitable space.

Growth of a family as well as increase in affordability - an example of this could be an instance whereby a relative from hometown decides to migrate and stay with the family and has a job. Change in this case is the simultaneous development of infrastructure and increase in habitable space.

When an extended family breaks into two nuclear families - possible implications might include increase in privacy conditions (change might result in a shift whereby one of the families decide to move or if possible party walls to divide one dwelling into two).



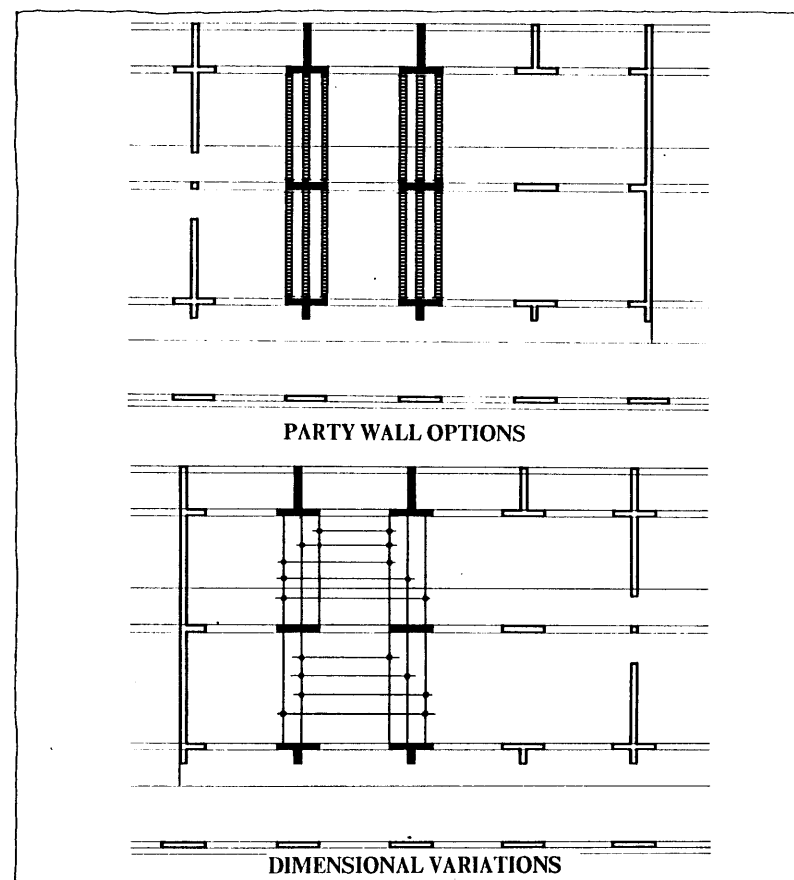
BASIC AREAS		The idea of providing basic dwelling unit options is not only to accommodate varied income groups but also varied family structure, since at the outset the composition of the family is likely to be diverse in range.
Area in sq.ft.		
120 - 150	 	
151 - 180		
181 - 210	  	
211 - 240	    	
241 - 270	    	
271 - 300	  	
301 - 330	   	
331 - 360	        	

361 - 390		
391 - 420		
421 - 450		
451 -		
<p>Increase taken in terms of a bed space and additional storage Increase taken in terms of a bed space and additional storage</p> <p>Bed space - 20 sq.ft. Storage - 10 sq.ft.</p>	GROWTH POTENTIAL (sq.ft.)	
	200 - 250	A
	251 - 300	B
	301 - 350	C
	351 - 400	D
	401 - 450	E
	451 - 500	F
	501 - 550	G
	551 - 600	H
	601 - 650	I
	651 - 700	J
	701 - 750	K
	751 -	L

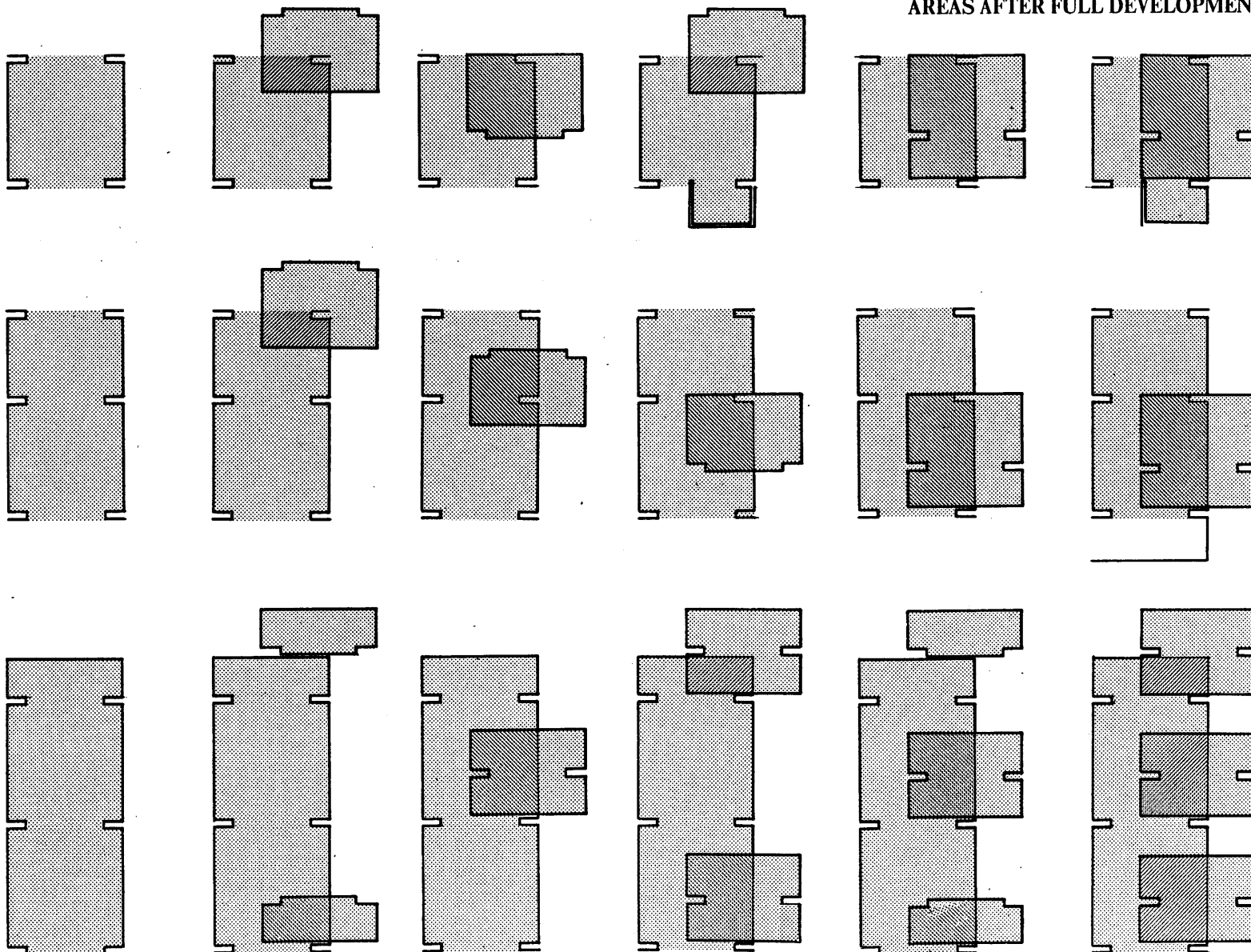
Besides, judging from the background most of the families hail from, it is more than likely that there would be families who would opt for smaller dwellings (even if they could afford bigger dwellings) simply because housing need not necessarily form their top priority once they have a roof over their heads. Hence one cannot categorically assume smaller dwellings to be exclusively occupied by the low income groups.

Again, the chances of the users changing their residences once they are settled in one dwelling is extremely remote. Hence, bearing this phenomenon in mind, the principles of evolutionary housing strategy should be concentrated towards growth potential within dwelling units. This implies that sizes and volumes of the dwelling themselves cannot be altered and possibility of growth should be in the form of increase in habitable area which could be through the introduction of levels within the fixed volume. In the design, growth potential is achieved through the provision of 12' 6" floor to ceiling height so that it can accommodate a 5' 0" high mezzanine. Zones have been allocated where such developments can occur, still maintaining comfortable cross ventilation conditions. Mezzanines also serve the purpose of providing visual privacy which is the most desired form of privacy in the cultural context. Privacy in itself is a highly subjective and a contextual issue and therefore it should not be compared to notions prevalent in the western world. It is possible that by western standards one might not be able to identify a private domain at all. Essentially, for any design effort to respond to change positively, one needs to understand the nature of growth that the support needs to account for - physically it means determining the kinds of basic variants* one is dealing with. In the case of the chawl, the basic number of spaces being the same, the subvariants* that are meaningful are in fact dimensional variations of

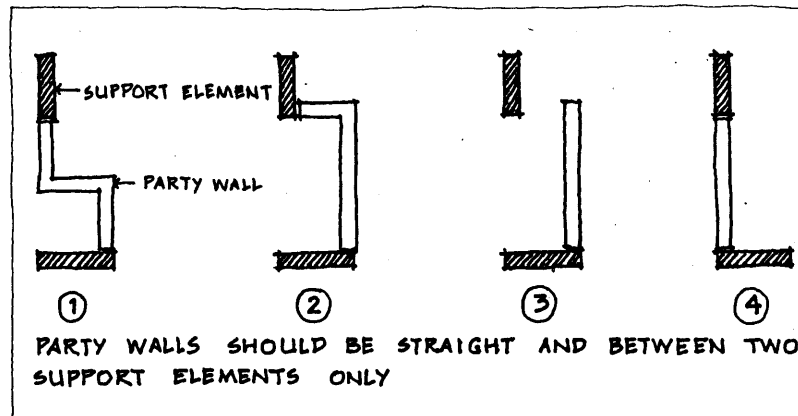
these basic spaces within the dwelling. Here when I refer to basic variants I imply the basic variants of the basic dwelling units and not with the mezzanines. The idea however should not be to provide as many dimensional variations as possible but simply the ones that changes the capacity of a space substantially, to justify its inclusion. Too many variations can mean too many party wall options which can lead to a problem of neighborly compromise.



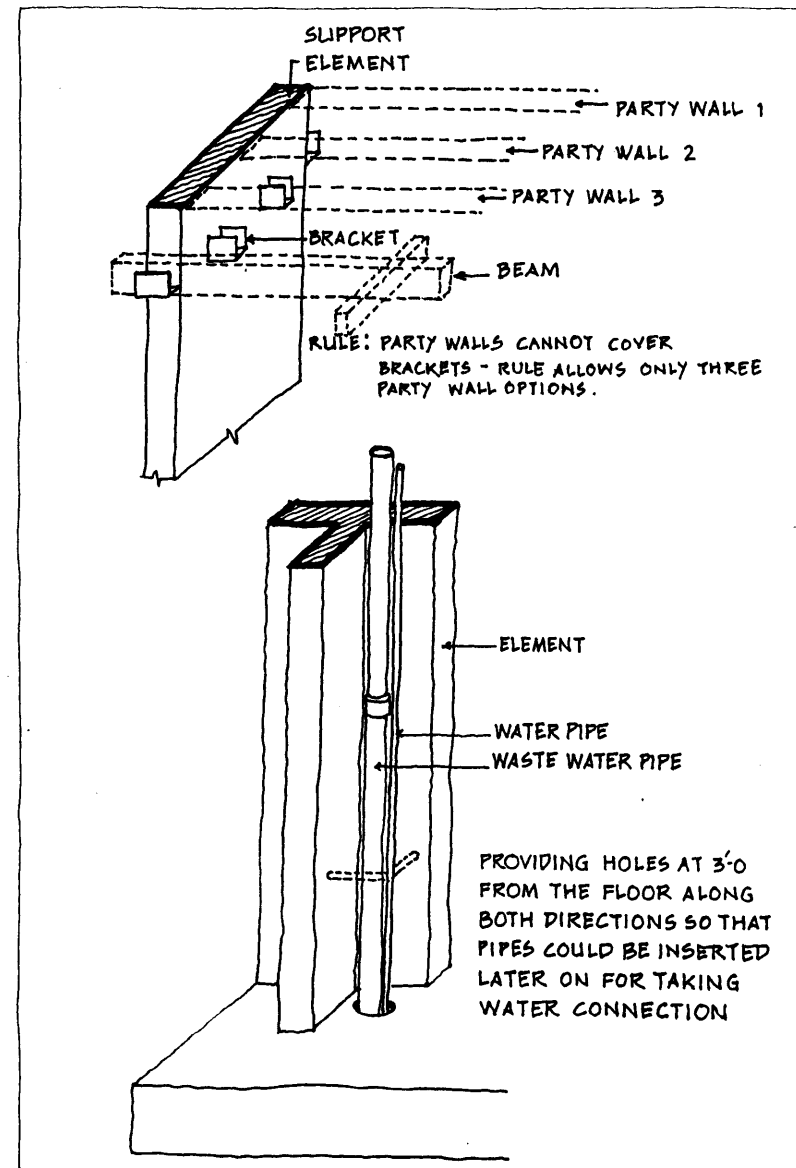
AREAS AFTER FULL DEVELOPMENT



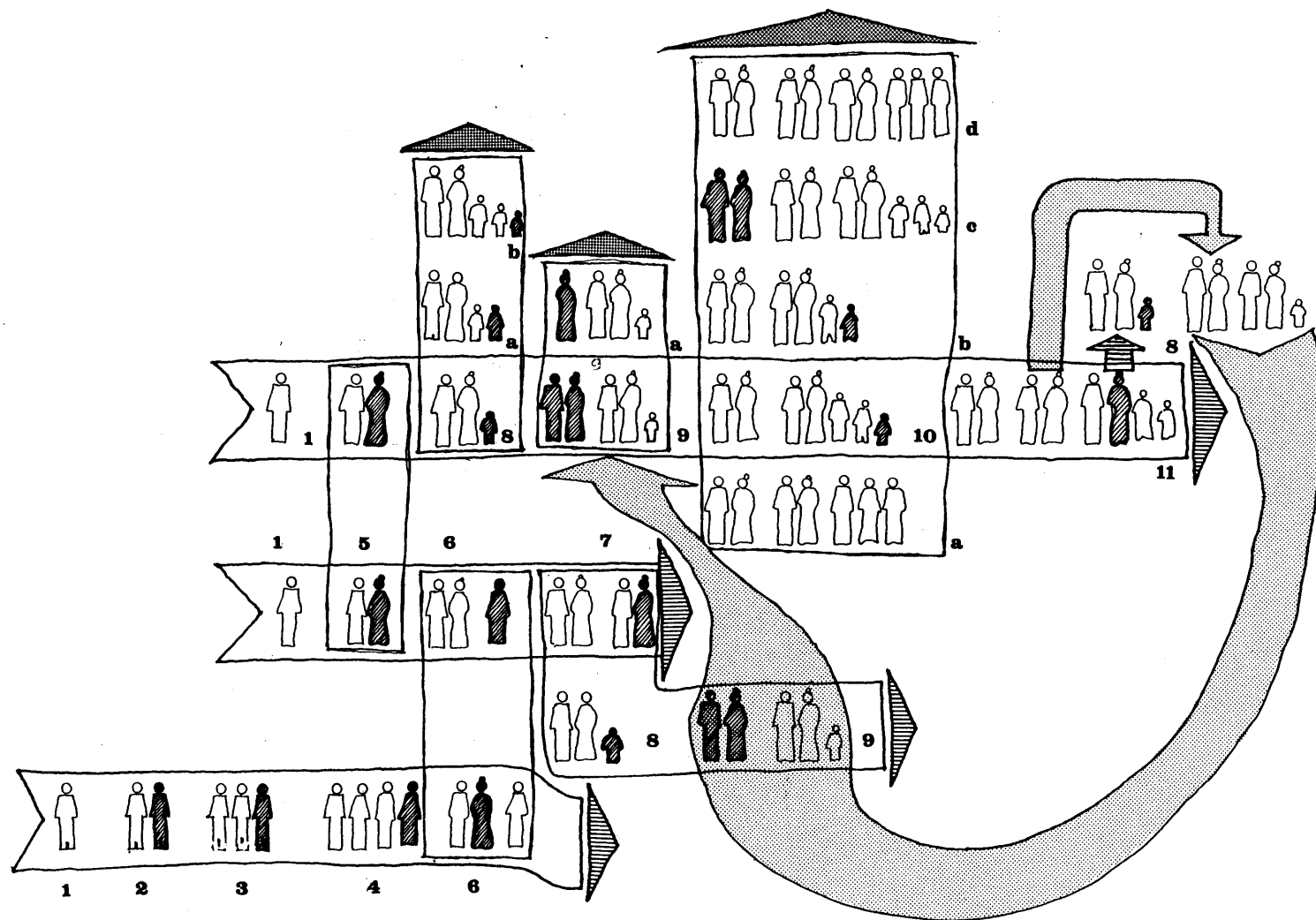
Party wall decisions form the next important factor in accounting for growth and change. To avoid confusion especially in a participatory process of this nature (i.e. involving the users in the decision making) the rules should be extremely clear. As a rule, I think it is imperative that elements of the support should be designed such that party wall options are implicitly evident to the user. Hence, as is the case in the reference design, I think it is useful as a rule to keep party walls straight and its position restricted between two support elements only.



While dealing with this issue, the study of special details in order to facilitate dwelling development needs to be included. Elements should be designed in such a way as to form a kind of built-in communication with the future dweller in a sense of providing recognizable physical clues (like brackets situated at the right positions to accommodate rafters or beams for mezzanines etc.) for further development. In the design, all the dwellings have a potential of growing to more than fifty percent of its basic area.



FAMILY STRUCTURE



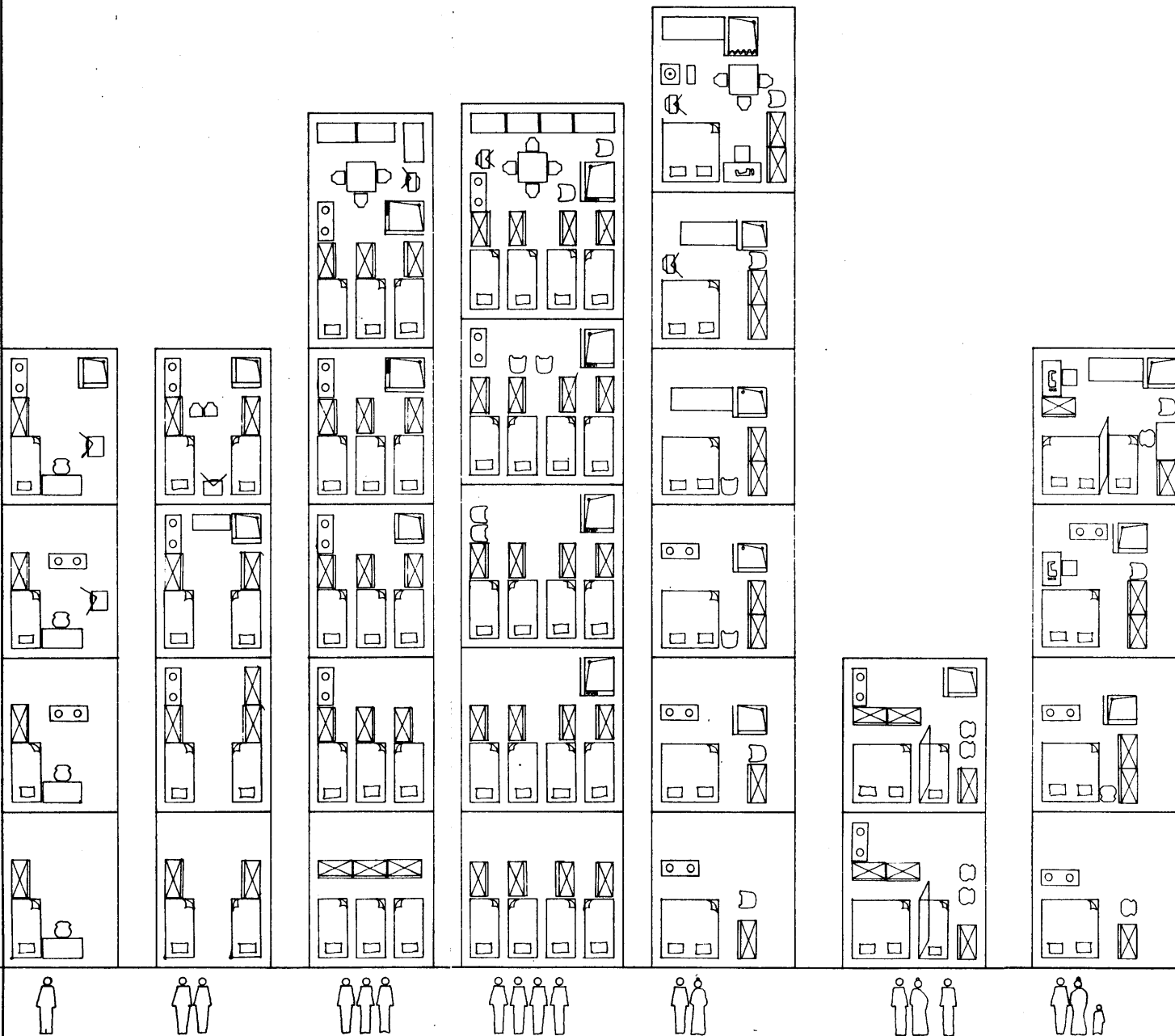
FAMILY STRUCTURE

To understand change in its proper perspective, we have to grasp the diversity of families and their manner of growth or change in structure through time. The diagram is an effort therefore to understand not only the kinds of families that exists but also the kinds of developments that take place in the family cycle.

Essentially, there are two kinds of households - Non-familial and familial. The non-familial structure can begin with a single bachelor and can develop to approximately four bachelors sharing a dwelling. Since the better part of the day is spent outside, their requirements are fairly loose. It has been observed that with increase in affordability the first thing all households adopt is cooking at home.

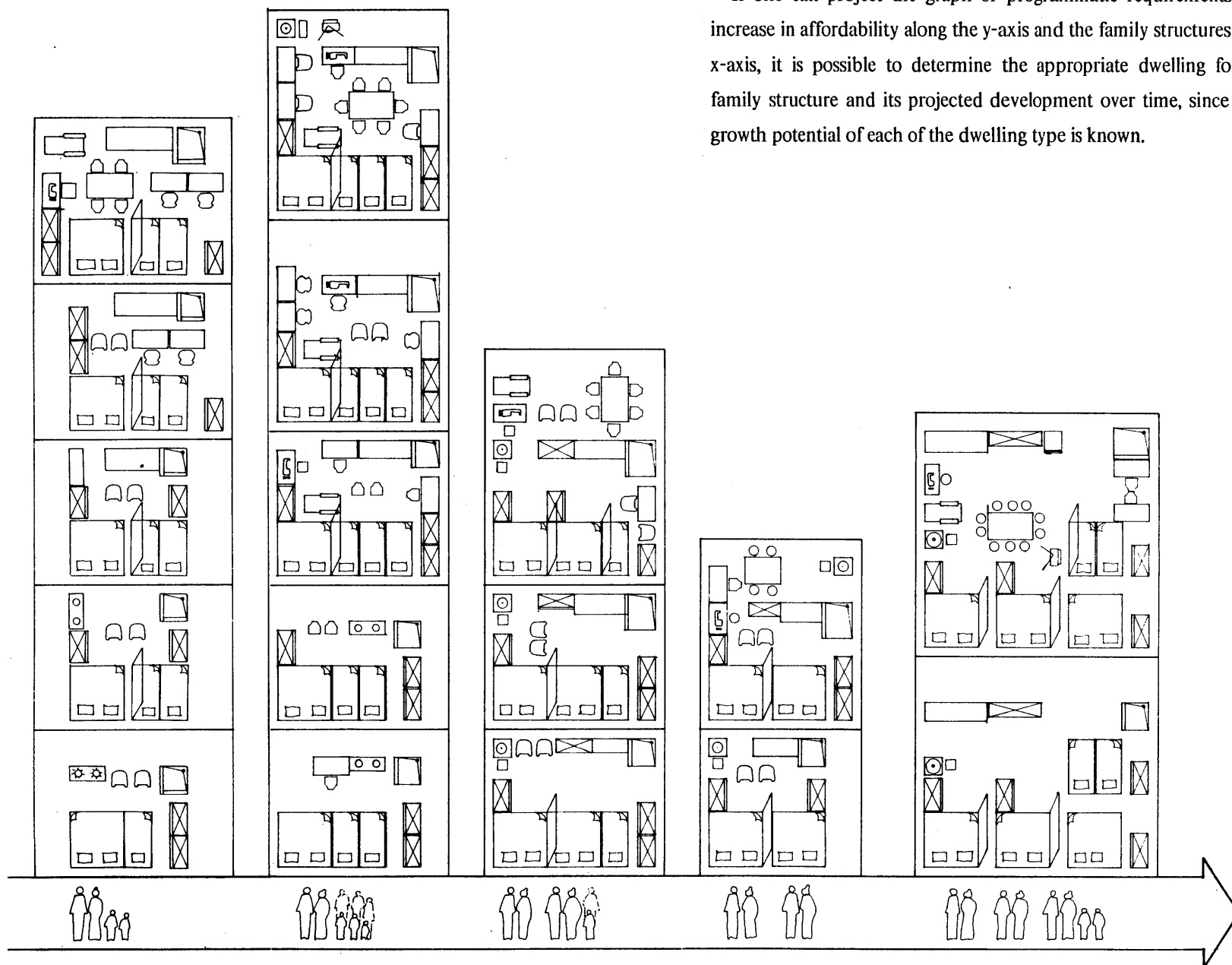
Drastic changes in this structure occurs when this household becomes familial in the sense that one of them decides to get married and stays in the same dwelling. In this case the other members have to leave unless they happen to be relative of the married couple. This is similar to a case where a relative comes from the hometown to stay with the couple. Privacy in this case is an essential requirement although even a curtain in most cases might serve the purpose. The relative can stay here even after marriage, but have to shift if either of the couples have a child, because they have to make room for the parents. It must be mentioned that with familial households, cooking and wash places are rudimentary functions to be accommodated in the dwellings. After parents move in, a place for worship becomes another important requirement. The stage by stage development is explained in the chart. What is important to note is that the system is very dynamic and changes are very frequent, occurring regularly within short intervals.

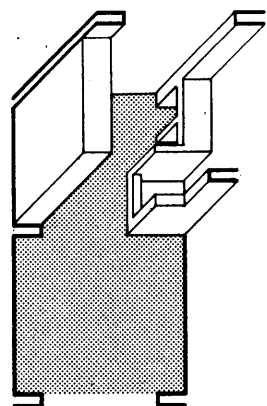
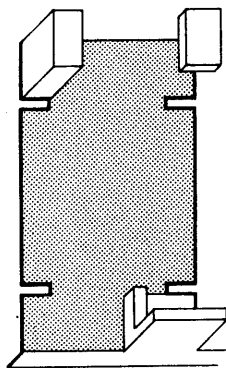
INCREASE IN AFFORDABILITY



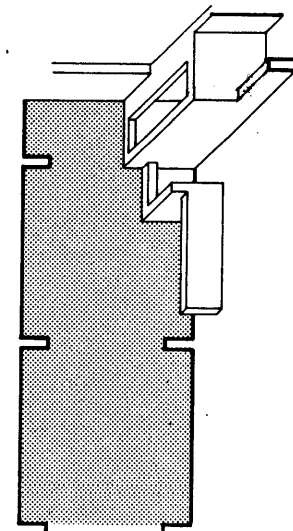
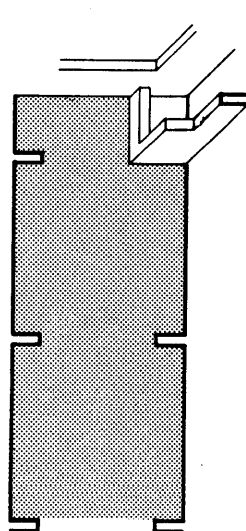
FAMILY STRUCTURE

If one can project the graph of programmatic requirements with the increase in affordability along the y-axis and the family structures along the x-axis, it is possible to determine the appropriate dwelling for a given family structure and its projected development over time, since complete growth potential of each of the dwelling type is known.





INFRA-STRUCTURE DEVELOPMENT WITHIN THE THREE BASIC UNITS



INFRA-STRUCTURE DEVELOPMENT

The problem of inadequate infra-structure facilities have been one of the most hard felt amongst the residents. One of the reasons is overcrowding and the infra-structures that are affected most are the sanitary and water supply facilities.

To deal with the sanitary condition, the following suggestions are made :

The number of toilets should not be based on the number of dwellings but on the number of users. The same is true of water supply.

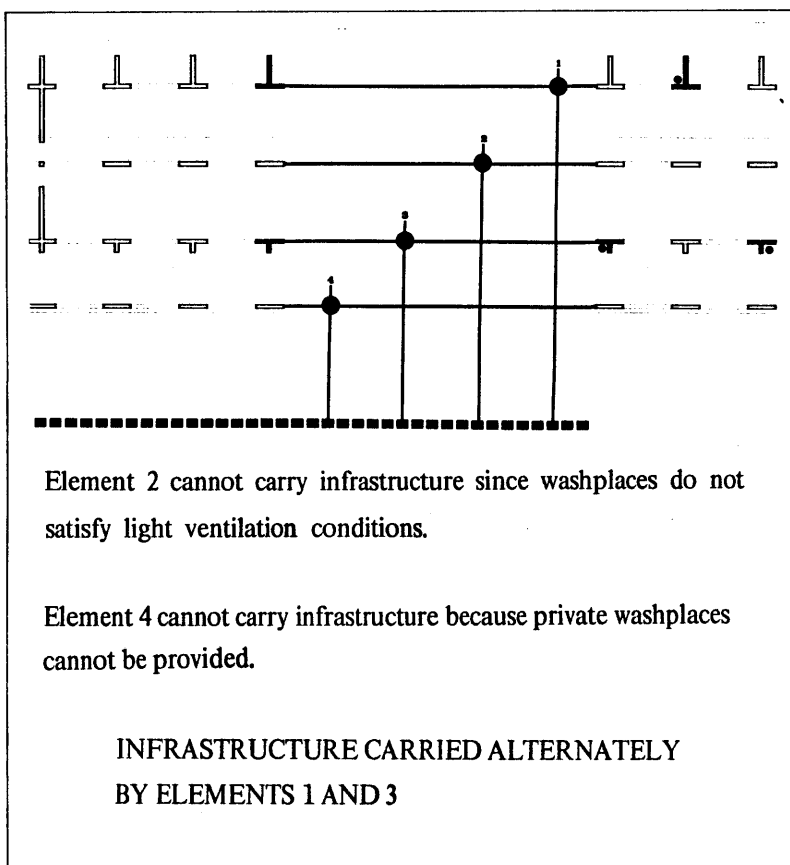
There should be a potential for increasing the number of common facilities which is what the previous clause implies in most cases. This could be done at the time of construction by making provisions for deferred development like putting additional soil pipes or at least providing them with fittings that could be connected to additional w.c. pans later.

In case of bigger dwellings, potential for bringing in individual w.c. to tenements might be studied. However, since this involves additional expenditure, the affordability of the target income group needs to be determined and consensus amongst users needs to be clarified. This is a specific case as generally residents do not prefer the idea of having a toilet in such a small tenement.

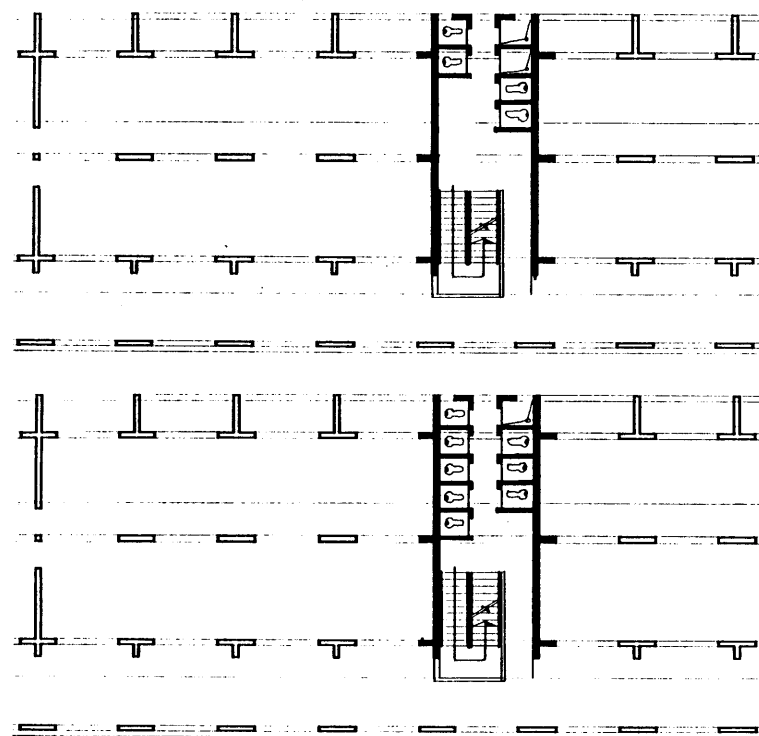
For water supply it is mandatory that all the tenements have a wash place. Besides, at the support level, every chawl must have overhead storage tank which is hardly the case presently.

Along the same lines, potential for adding extra power points also should be included, since at the basic development stage of adding a mezzanine calls for additional lighting requirements.

Irrespective of potential for infra-structure development, conditions cannot ameliorate without adequate maintenance. Maintenance should be a joint endeavour of the authorities and the residents as complete reliance on any one of them would be unaffordable for the parties concerned. This necessitates granting more control to the user (which until now the authorities have been reluctant to grant) as such incentives could result on the assurance of greater security and power.



Since all dwellings have wash places which could be converted into bathrooms, the common bath rooms should have the capacity for being converted into a toilet. This could ultimately give a much better ratio of a toilet for every two dwelling units on the top floor and a toilet for every dwelling unit on the lower floors. Accordingly, the floors of the bathrooms should also be sunk at the time of construction, so that Indian type w.c. pans could be accommodated later. This will involve additional expenditure at the outset but it is also an investment which is likely to pay rich dividends as bringing in soil pipes later could be a great deal more difficult.



TERRITORIALITY

In order to grasp human territoriality, we must in my opinion, also take into account the non-spatial phenomenon of spiritual/intellectual territorial defense of cultural values and norms on the individual and of the group -

The space that is under the control of one power may be defined as the territory of that power.

Territoriality, therefore cannot be isolated from aspects of control and power (which power controls what and to what extent and through what means). It is the lack of right control by the right powers that has disrupted the general environment in a chawl inspite of the territories being clearly defined in many cases. By right powers I mean the residents of the chawl. Until now, the users have had no control beyond the right to use which means that the power controlling the chawl have been the higher level power (either the authority or landlords). The concept of the chawl as territory therefore has been nonexistent thus far.

The application of an evolutionary design strategy would therefore mean the concept of territory which would not only be concerned with the right of use but also with the right of transformation ; this is true for all the domain levels in the chawls. At the lowest level of the dwelling, all that has been discussed in the issue of growth and change is meaningless without the right of transformation. A healthier man-environment relationship can only exist if the user has enough territorial control. In the case of the dwelling level this means that the dwelling should be able to adapt to user's requirements rather than the user having to adapt to the dwelling. All the three levels, namely the private domain of the dwelling, the semi-private domain of the corridor and the semi-public domain of the courtyard, are regarded as differentiated territories of responsibilities and decision making about environmental development and maintenance. Optimum possible

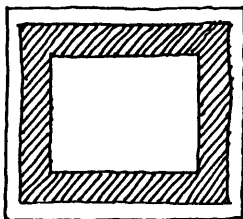
functions and human requirements necessitates increasing control of the territories for the user.

For the purposes of this study, the scope has been restricted to the level of the chawl. The domains that will be tackled in this issue will therefore be the courtyard and the corridor and the dwelling.

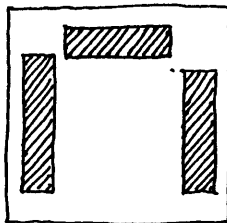
Courtyard The physical territorial elements that can be identified are -

The built-up chawl itself - this has been taken as an element to illustrate the fact that the form plays an important role in the performance of the courtyard in terms of stimulating activities on the part of the users. Broadly speaking, there are two kinds of forms that can be observed for a chawl

Peripheral - All these chawls have been built by private developers. The building forms an enclosure around the courtyard and clearly signifies it as the domain of the chawl residents only.



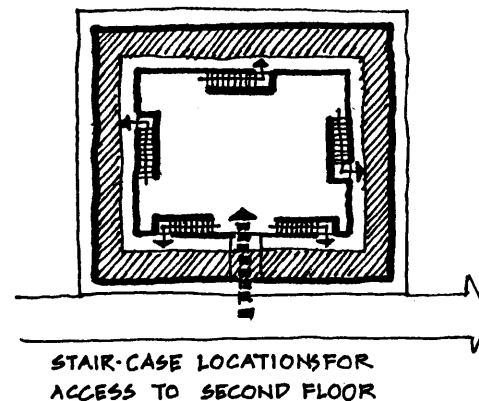
The other type of layout is separate individual buildings arranged on a site (which are adopted by the public authorities). The courtyard in this case is undefined so that the ambiguity of unclear delineation does not make it a clear



users domain. Control in this case is difficult for the user with the result that the open space is inappropriately used.

Clearly, enclosed peripheral form seems to be mandatory if courtyards are to be controlled by the users. This is evident in the functioning of some of the older chawls which still retain territorial control to a much greater extent than the more recent examples for the user.

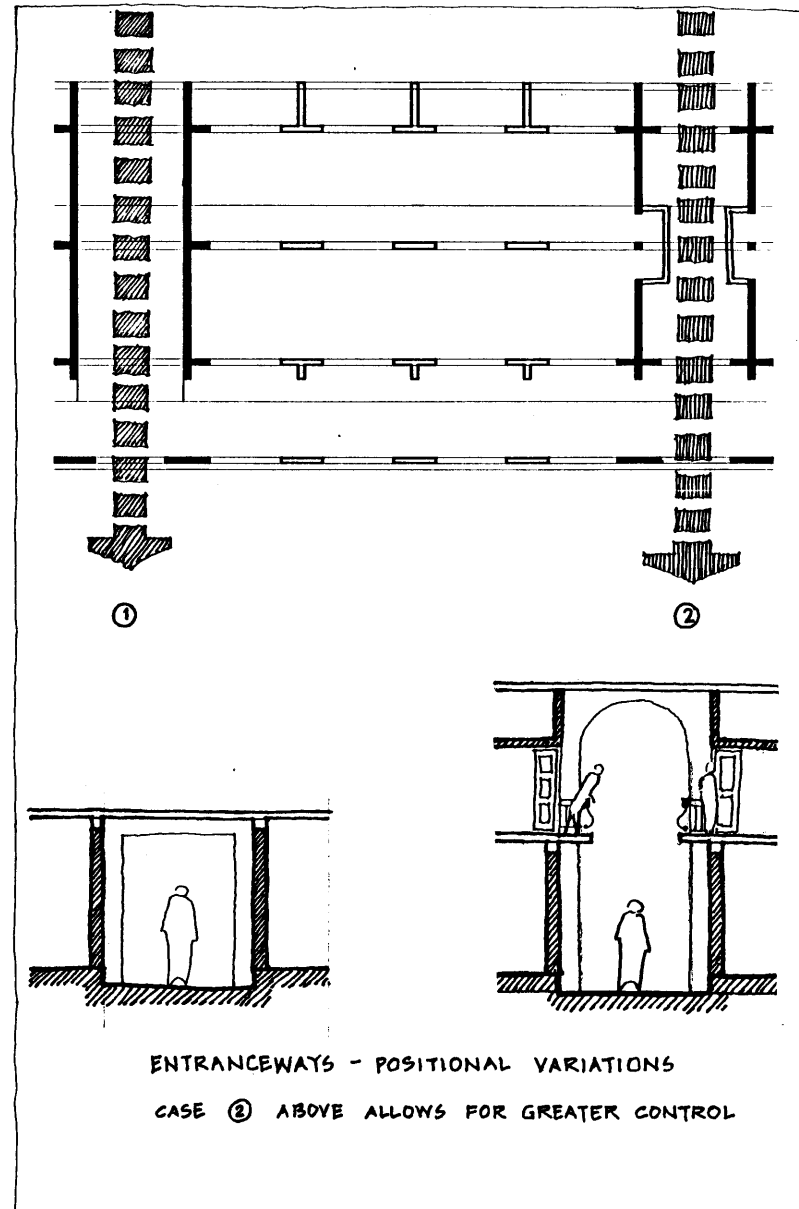
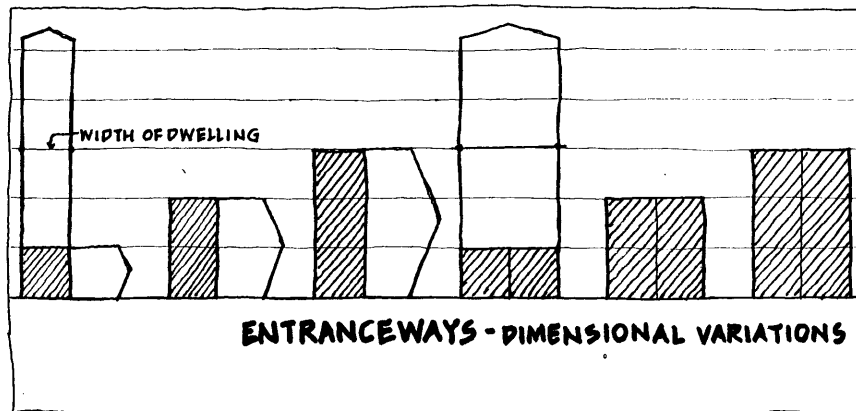
Staircases leading to the second floor should always be accessible from inside the courtyard.



The other rule is that there should be no commercial activity inside the courtyard. This is to prevent or check the courtyard from being used as a thoroughfare. Instead the set back rule should be used for the vehicles that need to be allowed to sustain the commercial activity.

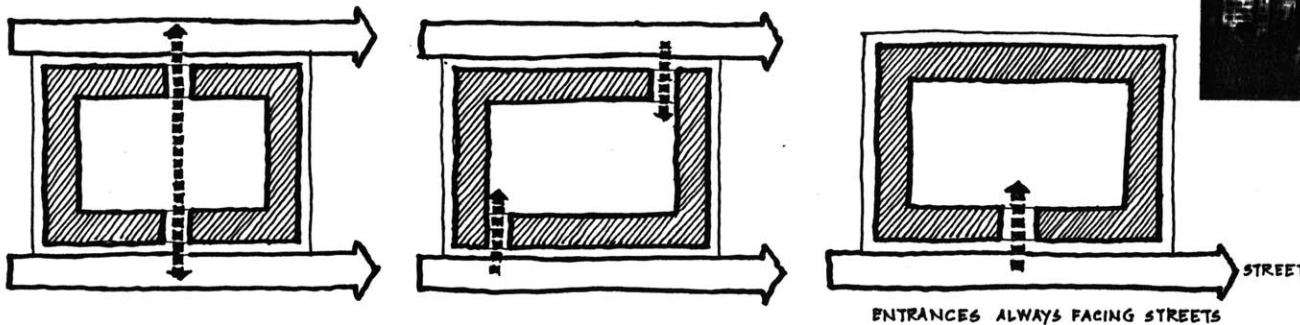
Entranceways - Most chawls originally had clearly demarcated entranceways giving access to the courtyard and the dwellings. This served as an explicit form of signifying the courtyard as the private domain of the residents. Most of the entranceways carried highly decorated motifs and a name as an expression of the developers' (may be even the residents') own idiosyncracies and cultural background. The width of these entranceways are usually multiples of the widths of the dwelling units (upto a maximum of two dwelling units) and the heights are multiples of floor to ceiling heights of the dwelling units (upto a maximum of three storeys). Entrances are always abutting the streets and the number of entrances vary with the streets the chawl has around it.

Too many entrances lead to the problem of vehicular intrusion, especially due to the commercial activities on first floor.



Gates - Entrances were provided with gates, usually for security purposes. However today, these are never operated due to lack of collective responsibility, commercial activity taking place inside the courtyard and the incessant pedestrian and vehicular traffic.

Entranceways are an useful means of control for the courtyard. They should be placed so as not to fall in the direct shortest path between two streets. Careful location of the entrances can eliminate the function of gates.



Power at the higher level (the authorities) can help maintain security in the chawls by making provision for pedestrian alleys.

Power controlling the courtyard should be the entire group of residents of the chawl.

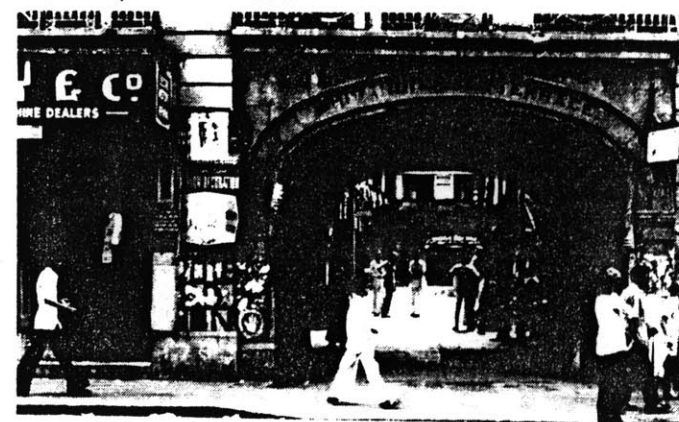
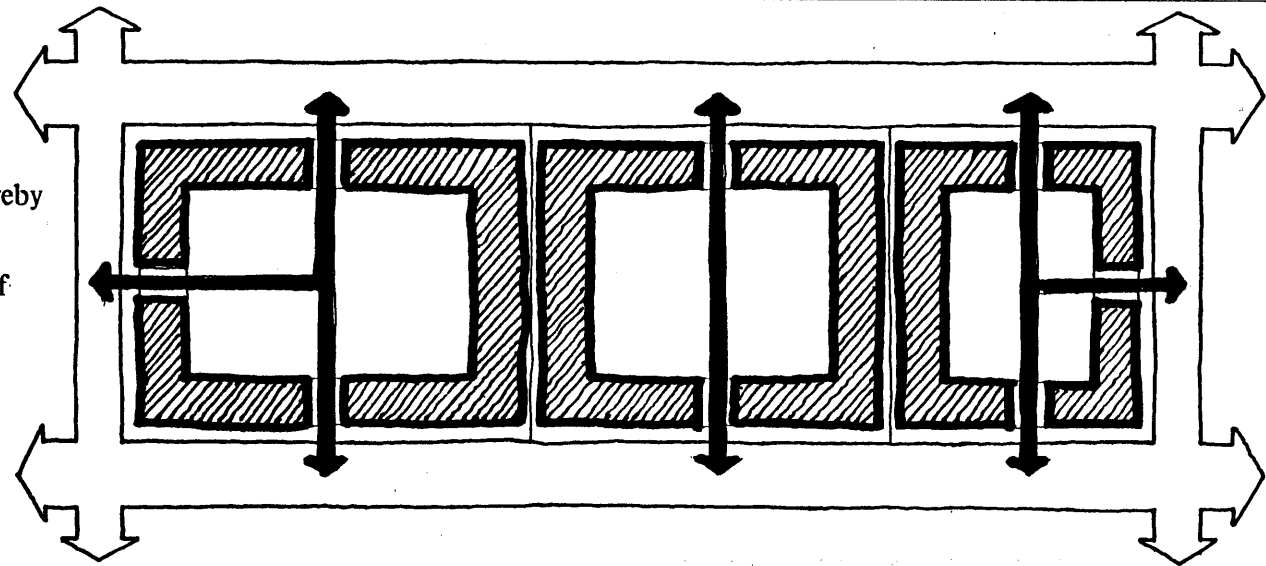
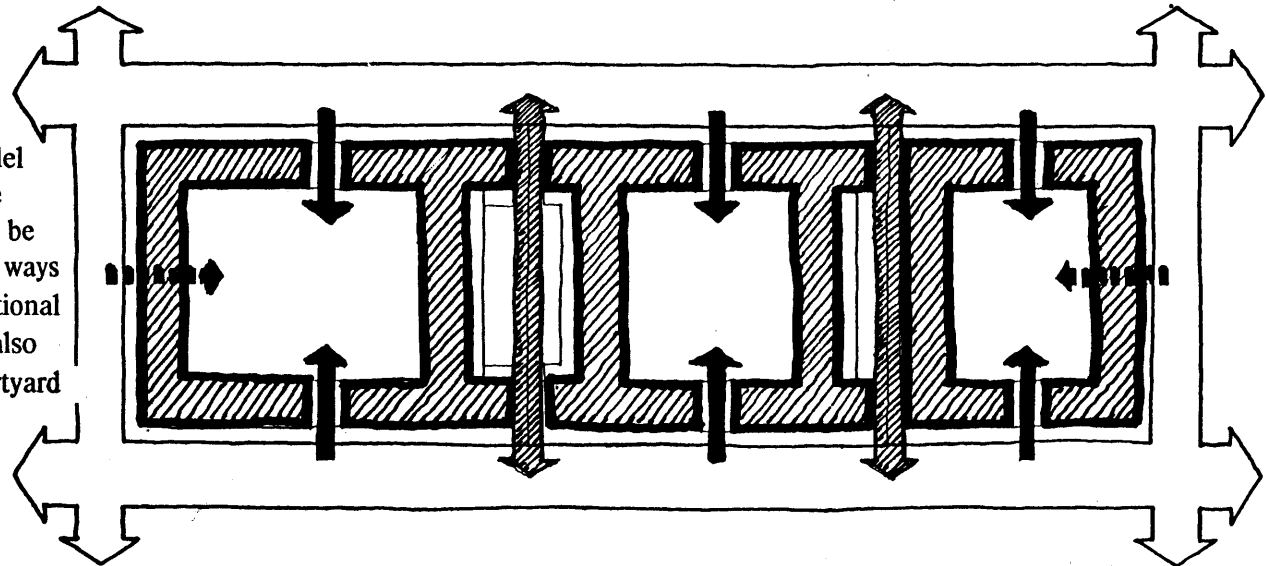


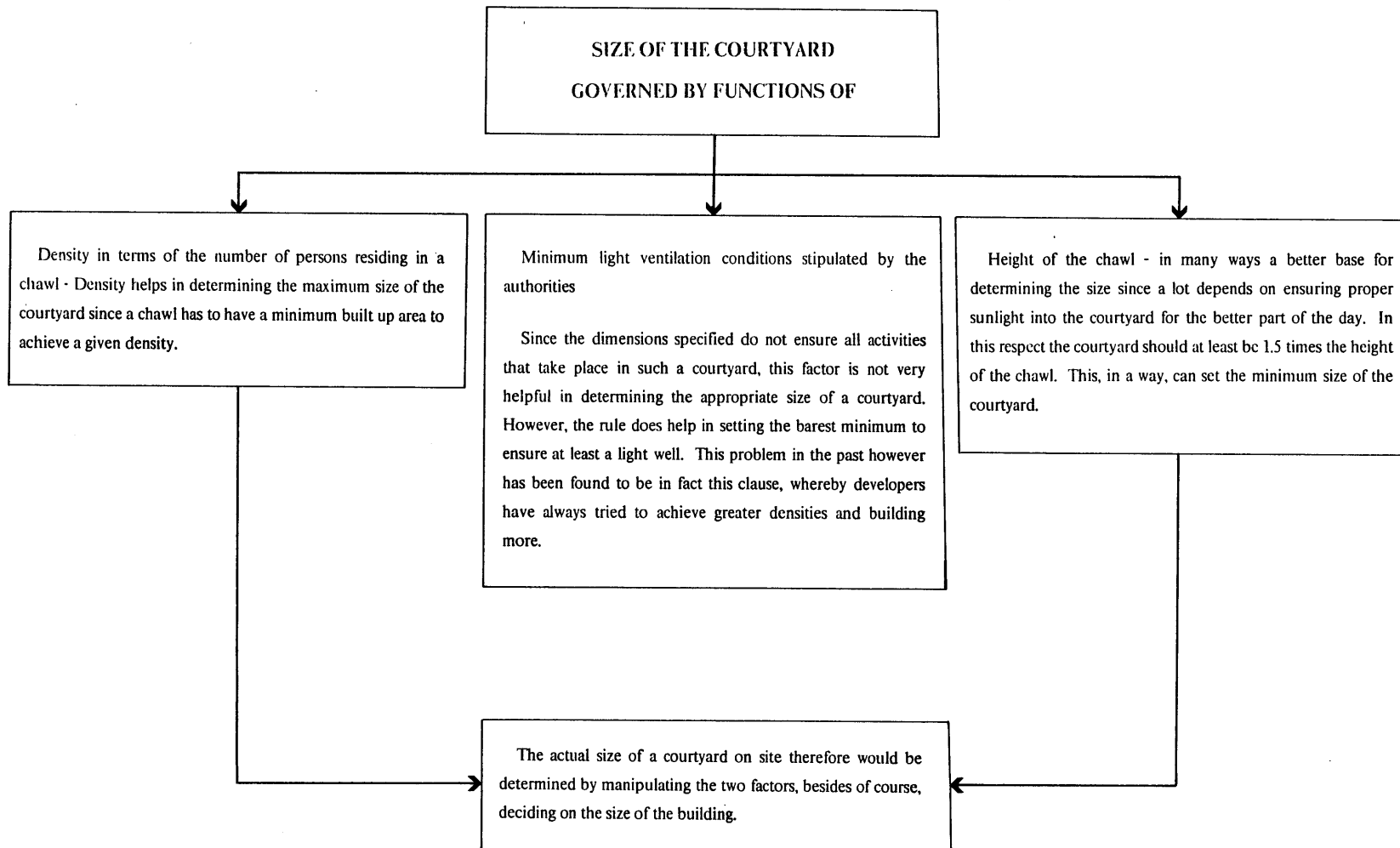
FIG. 1 shows existing model whereby the courtyard becomes a thoroughfare due to lack of pedestrian ways.



ACTION OF HIGHER POWER TO CREATE GREATER CONTROL WITHIN CHAWLS

FIG. 2 shows the proposed model whereby the setback rule between buildings could be used to create pedestrian ways with possibilities for additional commercial activities. It also retains control of the courtyard for the residents.

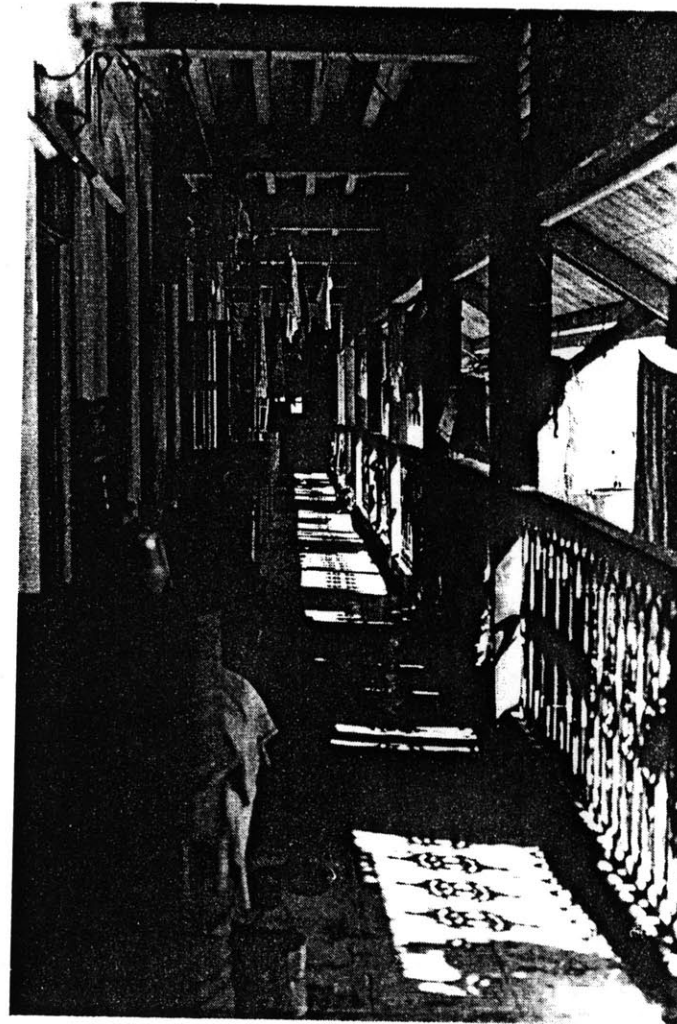




Corridor

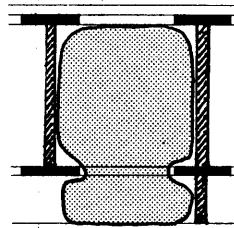
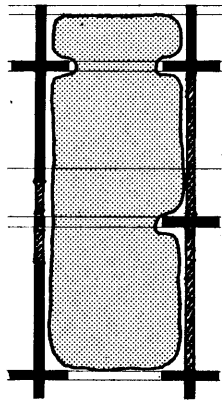
Although the right of transformation has never been observed at this level, consistent with the evolutionary design principles the proposed models should allow for more control of the margins of the corridor and dwelling units, judging from the manifold activities that take place. Margins are the transition phase between the domain of the dwelling and that of the corridor. Traditionally, the semi-private domain has always played an eminent role in Indian life-style. In the case of the chawl, due to space restriction, it is all the more important to promote the rightful utilization of the semi-private domain by entitling that degree of freedom to the users. It becomes useful to identify the margins over which the users have the right to transform so that right of way is ensured in all cases. In the design this has been achieved through a change of levels. The figures show the possible transformations that can take place in the reference design, varying the extent of control.

Power controlling the corridor should be the group of residents belonging to that floor.

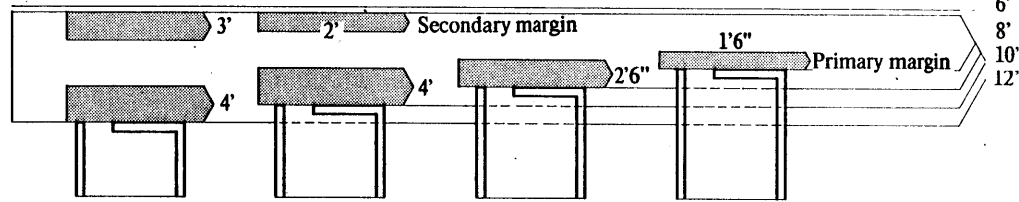


PHOTOGRAPH: View of the corridor of Pannalal Terrace in mid-day. (photograph by Avani Trivedi, 1978)

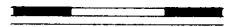
CORRIDOR



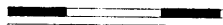
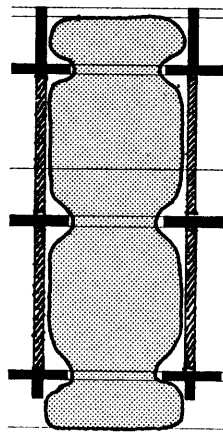
INFRA-STRUCTURE DEVELOPMENT
AS A RESULT OF USER
INTERVENTION



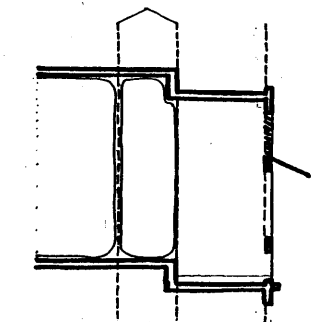
CORRIDOR DIMENSIONS AND MARGINS



THE CONCEPT OF
TERRITORIALITY BEING
RESTRICTED TO THE
PRIVATE DOMAIN-
MARGIN NOT UTILIZED
TO FULL POTENTIAL DUE
TO LACK OF CONTROL.
RIGHT TO USE BUT NO
RIGHT TO TRANSFORM

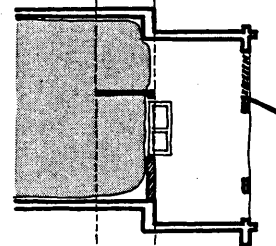
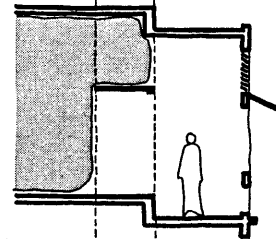


INTRODUCING A PRIMARY
MARGIN THAT COULD BE
CONTROLLED BY THE USERS



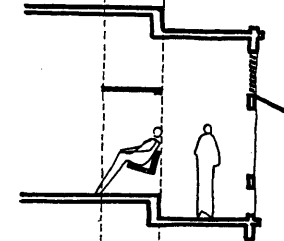
IDENTIFY THE MARGIN-
IN THE DESIGN THIS IS
DONE BY A LEVEL CHANGE

RIGHT TO TRANSFORM
COULD MEAN EXTENSION OF
PRIVATE DOMAIN

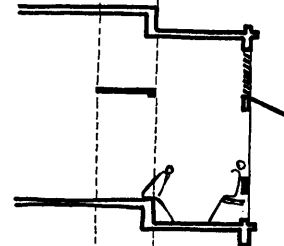


EXTREME CASE OF
USER CONTROL

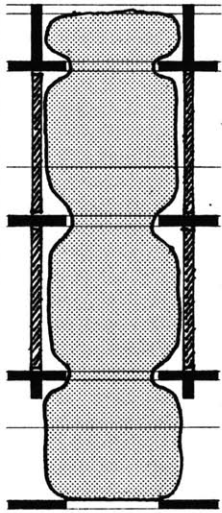
HETEROGENEOUS RESIDENT
GROUP NECESSITATES BOTH
OPTIONS -



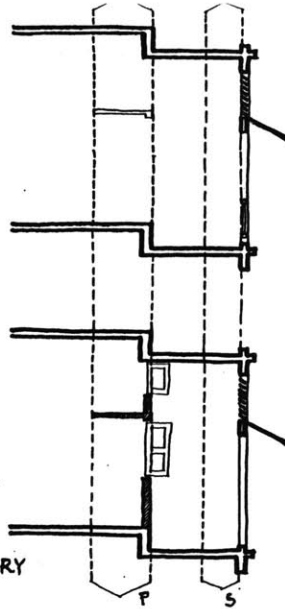
INCREASE PRIVACY



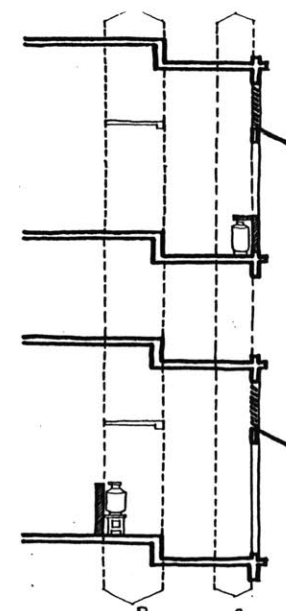
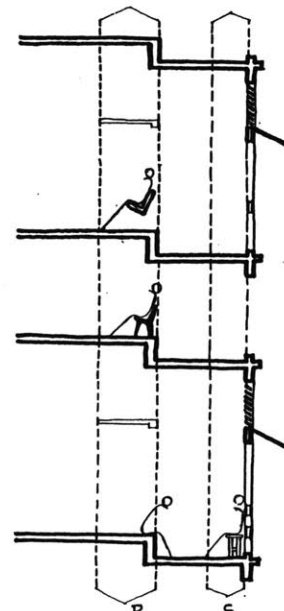
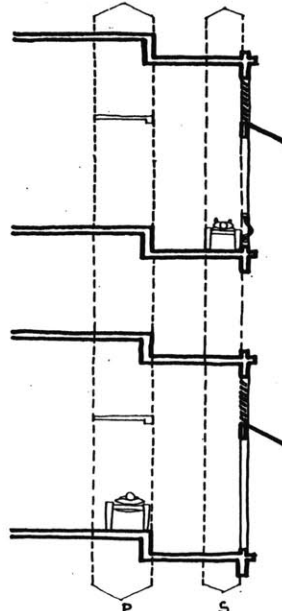
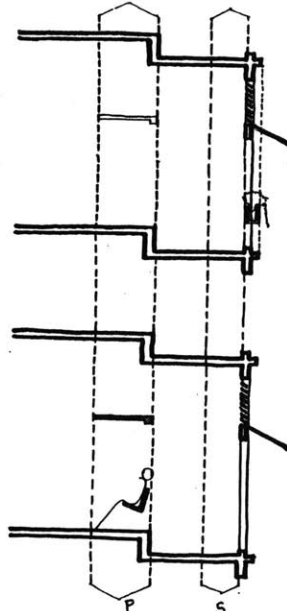
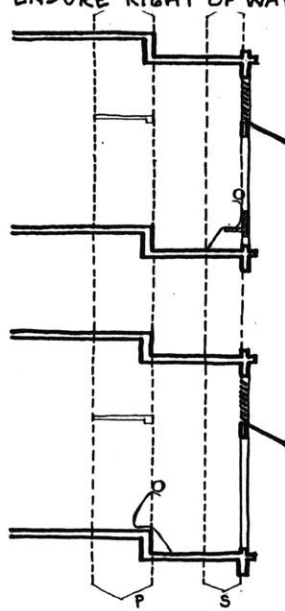
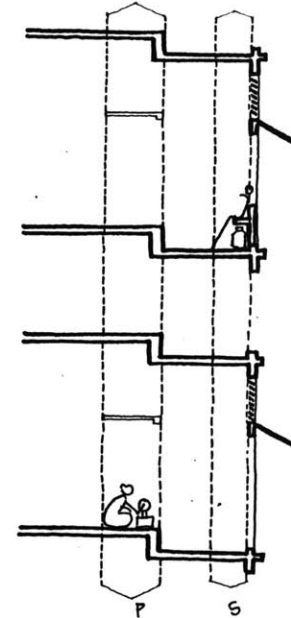
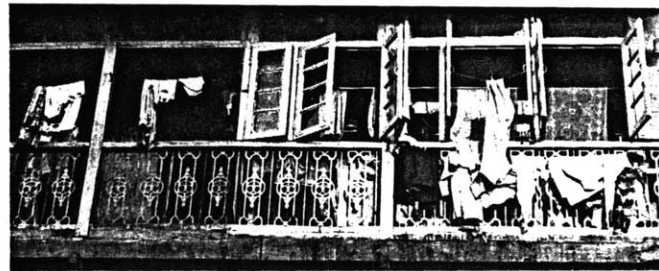
RETAIN INTRA-CHAWL
INTERACTION



INCREASE CONTROL
INTRODUCE SECONDARY
MARGIN
ENSURE RIGHT OF WAY



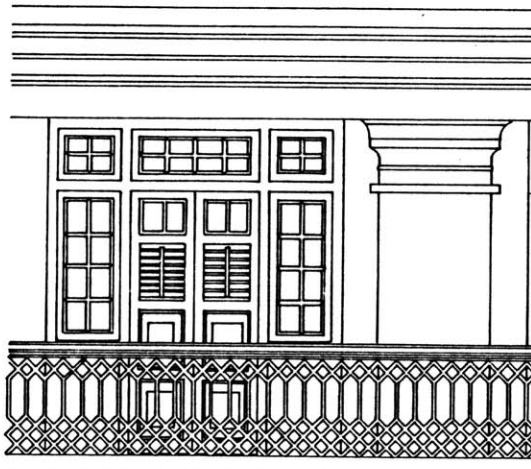
WHILE THE SEMI PRIVATE DOMAIN OF THE CORRIDOR AND THE MARGIN HAVE BEEN FOUND TO HAVE EXTENSIVE USE WITH THE USERS, THE DEGREE OF CONTROL THAT NEEDS TO BE PROVIDED CANNOT BE PREDICTED, AS THE RIGHT TO TRANSFORM HAS NEVER BEEN WITH THE USERS. HENCE THE DEGREE OF CONTROL IS A FACTOR THAT NEEDS TO BE DETERMINED THROUGH OBSERVATION OF USER INTERVENTION IN TIME.



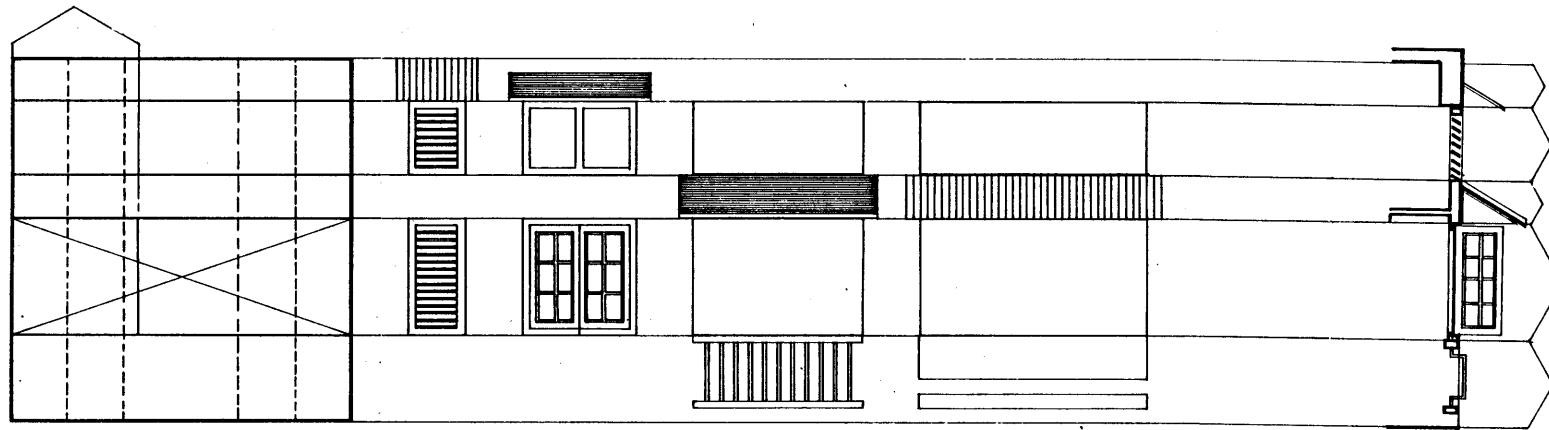
Dwelling unit

The kinds of transformations that can take place within the dwelling units has already been covered. With greater control, identity will find richer expression. One can go to the extent of letting the users choose even their own facade elements comprising of balcony railings, doors, windows, ventilators etc.. All that is needed is a set of rules suggesting their positions and dimensions. These rules are simply to maintain good light and ventilation conditions.

Power controlling the dwelling should be the family staying in it.



FACADES

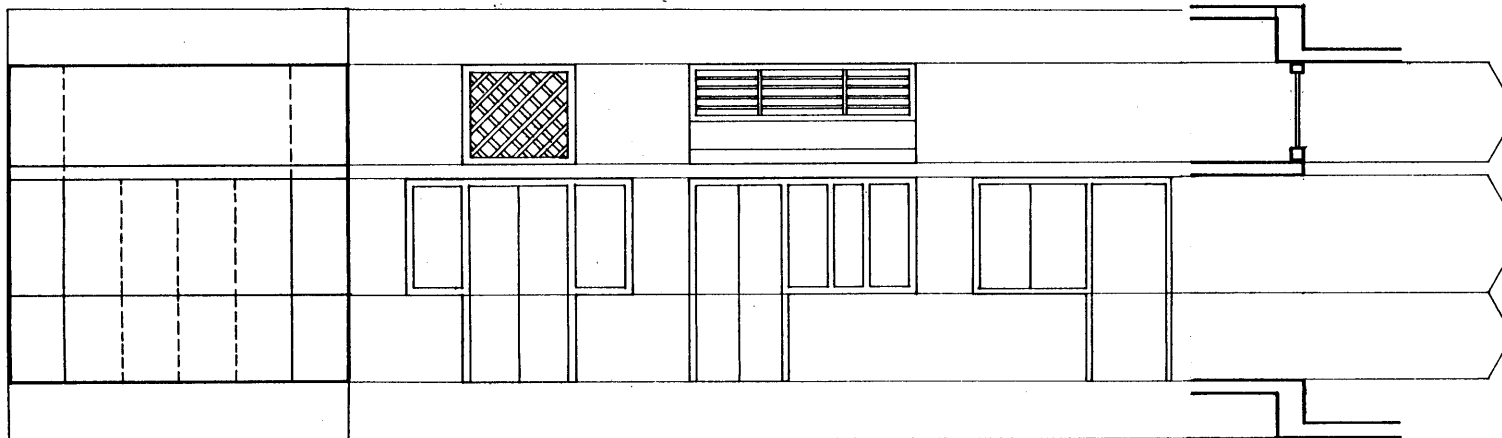


FACADE 1

RULES MINIMUM OPENING
WEATHERSHADE MARGINS



CONTROL USERS

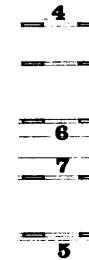
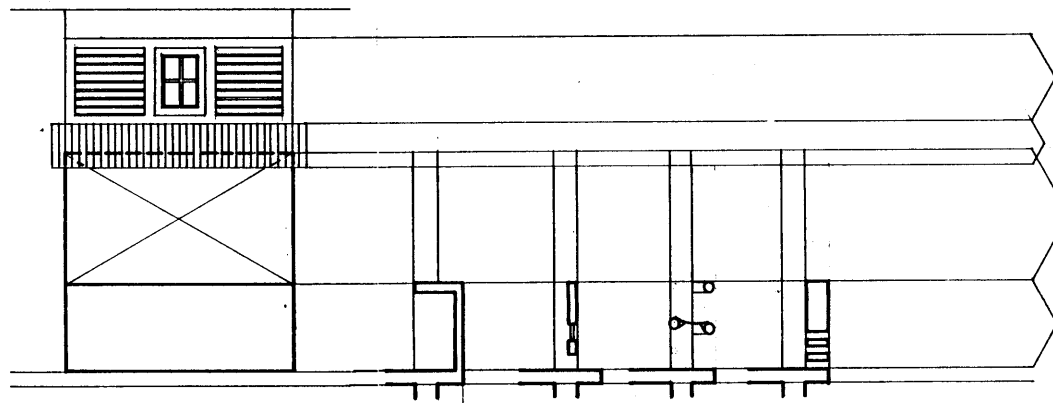


FACADE 2

RULES MINIMUM OPENING ONLY

FACADE 7 SAME AS FACADE 2
FACADE 6 SAME AS FACADE 2

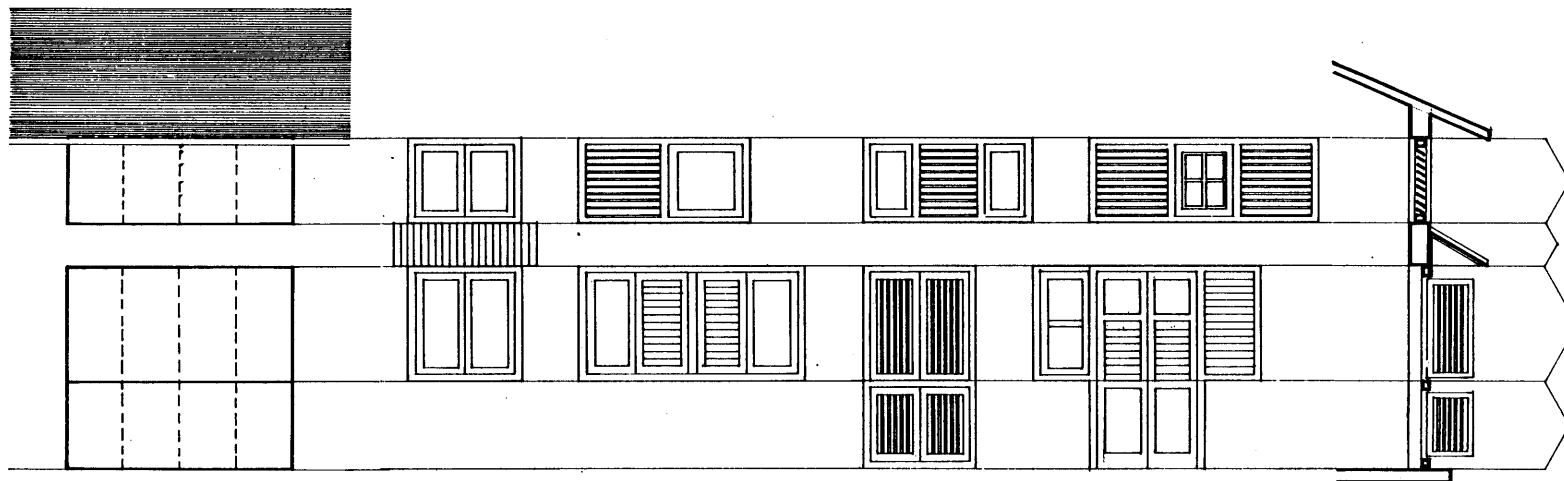
CONTROL USERS



FACADE 3

**RULES OPENING CANNOT HAVE ANY SHUTTERS
WEATHERSHADE AND VENTILATORS ARE
ALREADY PROVIDED**

CONTROL USERS CAN CONTROL ONLY THE ZONE FOR RAILINGS



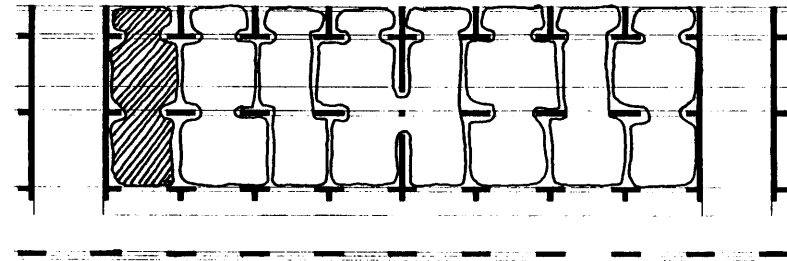
FACADE 5 SAME AS FACADE 1

FACADE 4 SAME AS FACADE 1

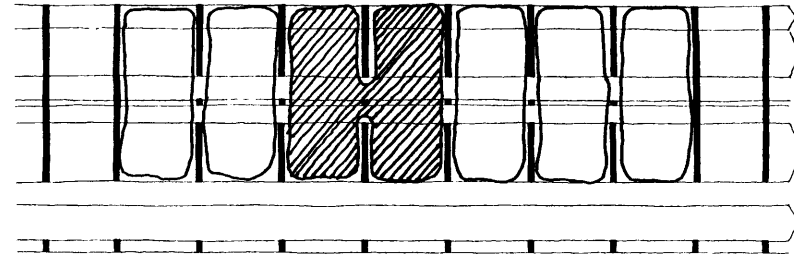
IMPACT OF AFFORDABILITY AND FAMILY STRUCTURE ON DESIGN DECISIONS

Affordability is gauged in terms of the capacity per household to pay rent or mortgage and the developers' capacity to subsidize the same. The degree of fluctuation in affordability is the factor that affects design decisions. The decisions referred to here are decisions regarding choice of elements of the support structure.

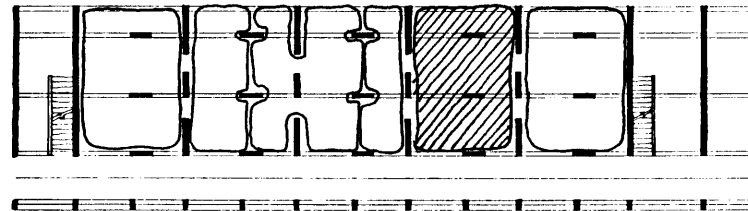
Essentially the different cases can be An instance where a wide range of fluctuation exists in terms of affordability, amongst the target resident groups. This is typical of chawls in a commercial area. The decision in this case should be geared towards designing a supports that can accommodate a wide range of dwelling size options. Morphology of the chawl dictates that more horizontal elements be used.



A case where affordability and family structure show a very narrow margin of fluctuation - in which obviously too many dwelling options are not necessary. By way of design decision this will warrant larger number of vertical elements since they restrict party wall options.



However, fluctuations in family size can alter the decision to more horizontal elements since, income remaining the same, affordability will vary with family size.



It is almost impossible to eliminate the issue of affordability from any decision on mass housing. Right from the planning stages to the miniscule dwelling, affordability determines the nature of intervention. What I have dealt with are more specific design decisions. At the broader level, affordability forms a key factor even in determining size of tenements, along with density and FAR (FAR determining the actual amount of built up area on a site which divided by the density determines the maximum average area of a tenement, making due provision for the corridor, staircase block etc.)

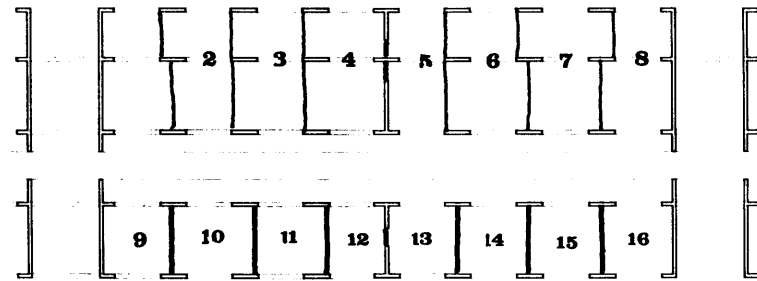
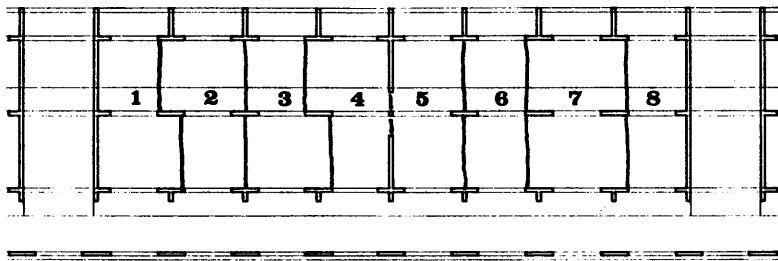
Dwelling distribution : by dwelling distribution I mean the degree of segregation or integration of small and large dwelling units. As a rule, it is useful to accommodate both small and large dwelling units in one support structure. As mentioned earlier, income need not be peoples only criteria for choosing a dwelling. One of the most interesting observations one can make about the private chawls is that it cannot be termed as low income housing. This is an important reasons why these chawls are more acceptable socially. Peoples choice is also influenced by their requirements and priorities. So the argument that by having smaller dwelling units on a different level than the larger ones (as is the case in the reference design) is segregating the income groups is not neessarily true. The issue of dwelling distribution therefore becomes highly project specific and dependent on other factors like structural economy, locational characteristics of a site, or whether the site is in commercial, industrial or residential zone.

DENSITY

Stipulating appropriate density for a given area falls essentially under the scope of planning and other social and economic fields, and demands a thorough knowledge of all the principles that govern such a decision. That is why this aspect has been excluded from the scope of this present research, since the emphasis here is on design aspects. However, being able to manipulate a structure to accommodate a stipulated density definitely forms a design decision, that I have attempted to deal with here.

Given a density and FAR, the first effort should be to minimise the height of a chawl. Although a height of five storeys is permissible, greater height could possibly turn the courtyard into a mere light well, thereby hampering the rightful use of the courtyard.

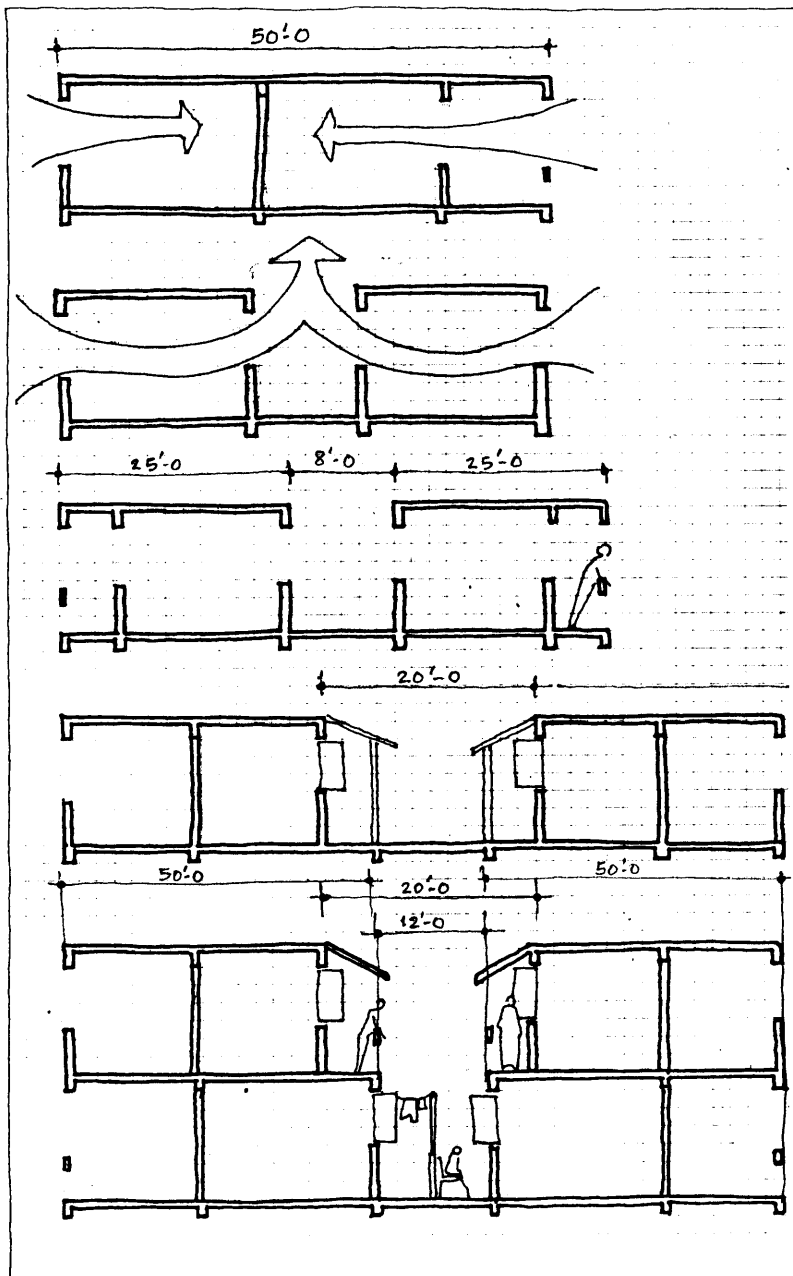
The need to minimise the height makes the width of a dwelling unit an important decision. This again could be attributed to the morphology of the chawl. Since the distance between two staircase blocks is fixed (i.e. 100' as specified in the bye-laws) it is the width that determines the number of dwelling units that can occur at every 100' distance.



From the study it follows that the minimum average width of a dwelling should be 12'-0, (minimum average width being different from minimum width which is 10'-0), so that the maximum number of dwelling unit that can occur between two staircases 100'-0 apart would be Eight in the case of a singly loaded corridor, and Sixteen in the case of doubly loaded corridor

The widths and number of dwellings would then decide the number of structural elements that would optimise structural economy.

However, density is a constraint that states only the maximum limit and not the optimum and hence decisions cannot entirely be based on density alone, although it forms an useful criteria for manipulation.



WAYS OF MANIPULATING DEPTH

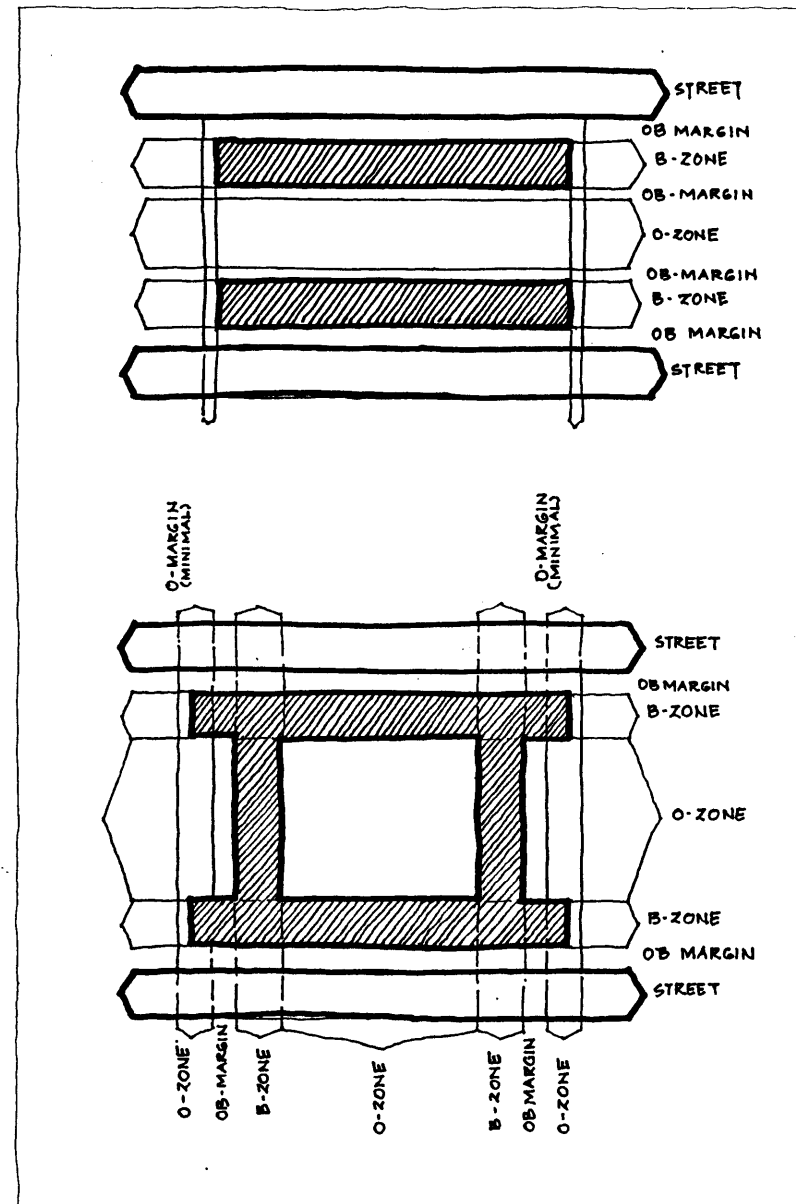
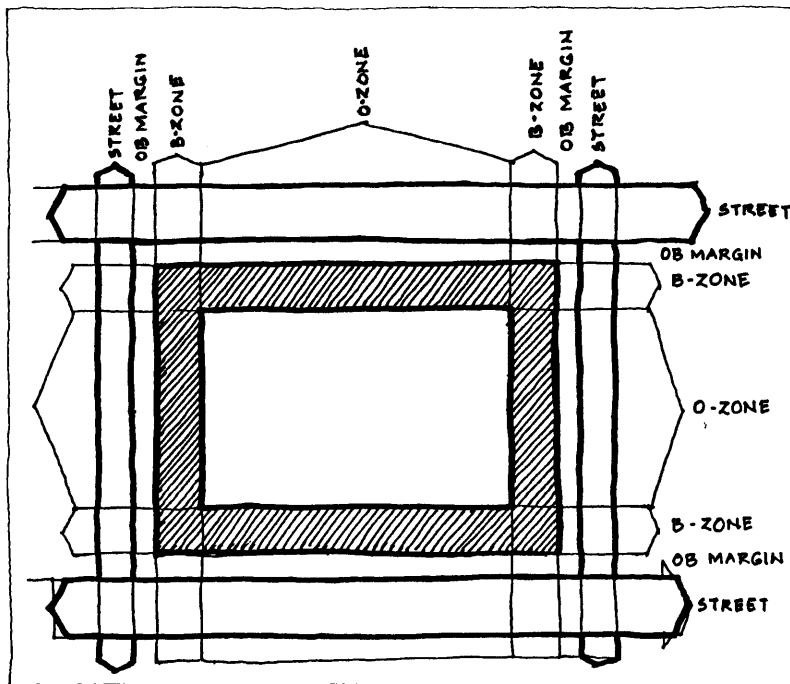
The depth of the built up chawl (i.e. the dwelling along with the corridor) would depend on the dimensions of the site. The cross - ventilation rule could be used to manipulate depth of dwelling units, as shown in the figures. There could well be cases where proper utilization of the courtyard could only be ensured through privatization.

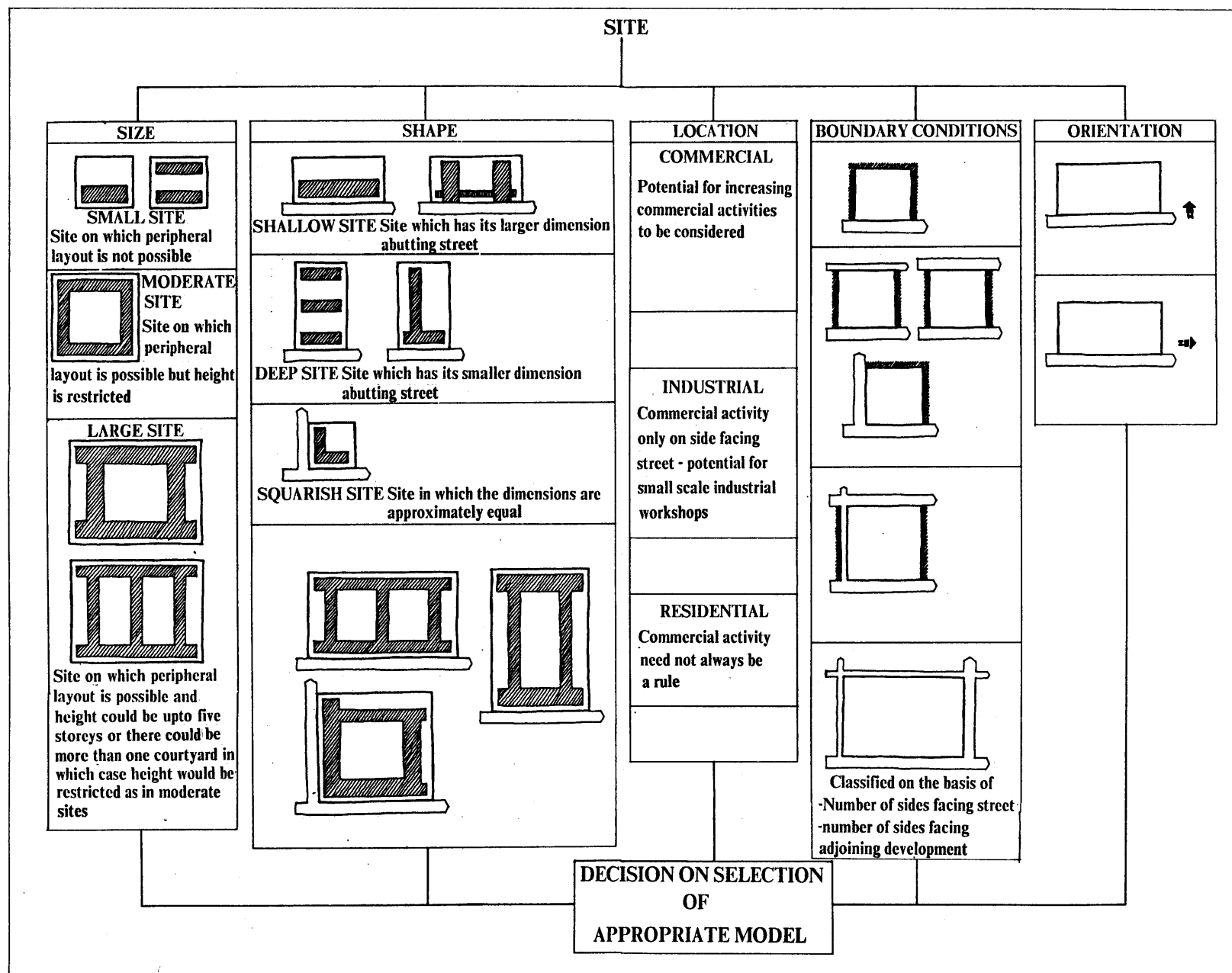
SITE CHARACTERISTICS

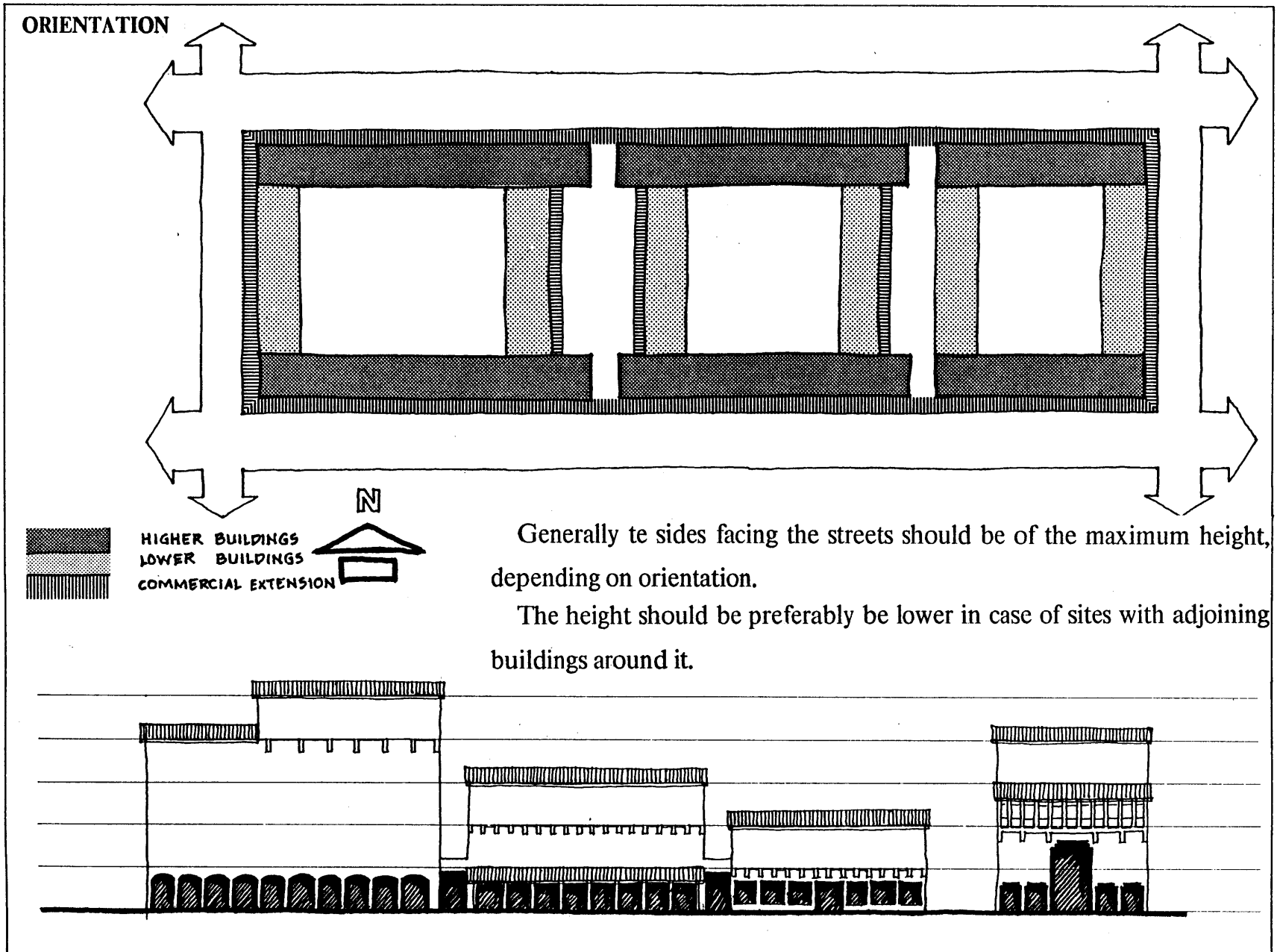
Selection of an appropriate model depends on the specific characteristics of a project site. Factors determining the selection are represented in the diagram.

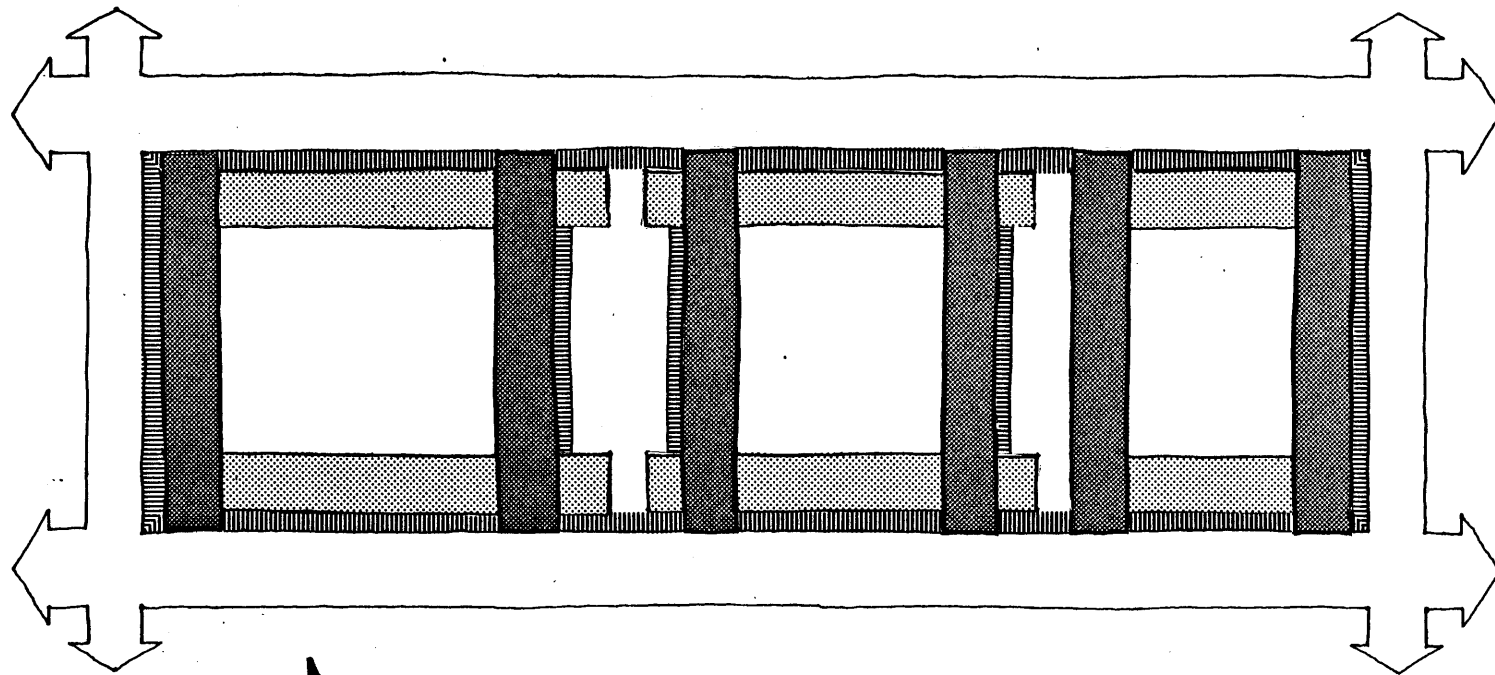
Generally, the objective should be to adopt a peripheral layout wherever possible so that the courtyard could be enclosed.



The general model comprises the street, an open-built margin, a built zone, a closed open zone, a built zone, an open-built margin and a street. The open built margin is provided for the extension of commercial activities on first floor. it could ultimately be a covered walkway, as is observed as a theme in some of the older quarters of the city.





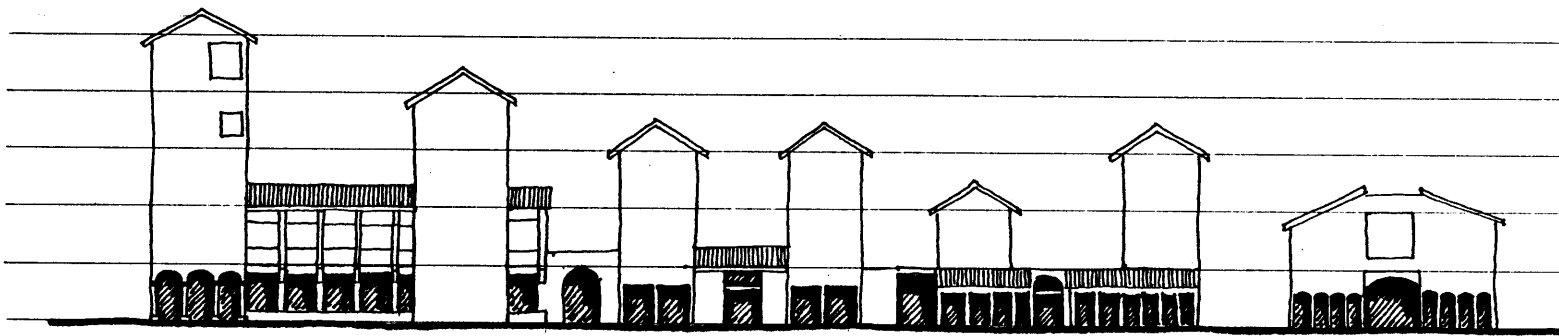


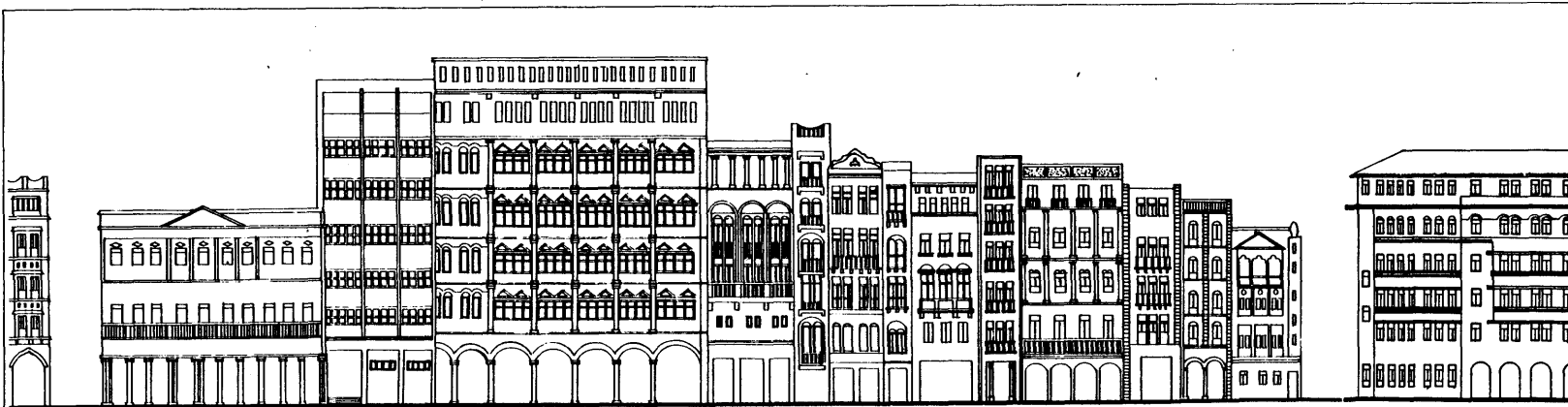


 HIGHER BUILDINGS
 LOWER BUILDINGS
 COMMERCIAL EXTENSION

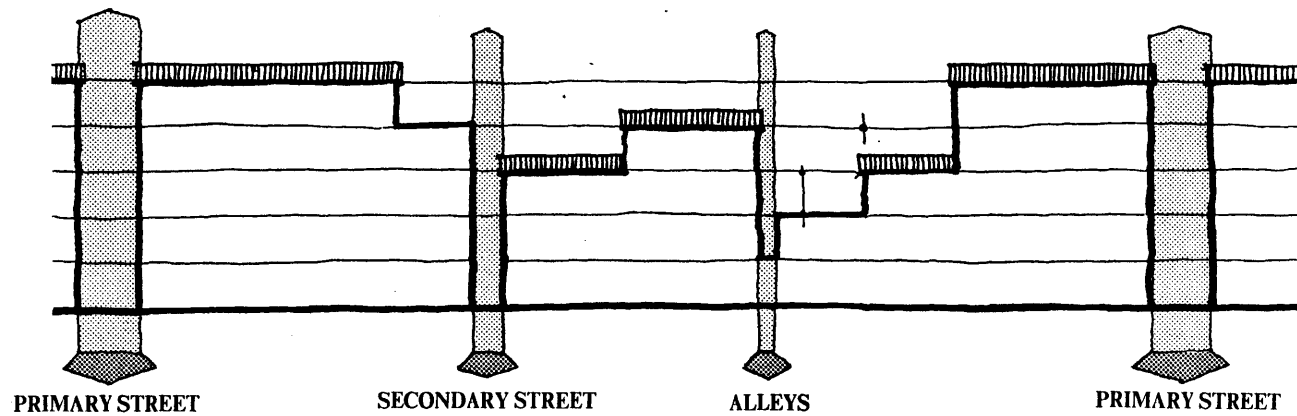


As a rule, predominant orientation of the dwellings should be N-S , to ensure proper light and ventilation. shops should always face streets or pedestrian alleys, as in the proposed model.





Implicit setback rules observed as a theme in the older quarters of the city



As a rule, buildings facing primary streets should be higher. Buildings abutting alleys and secondary streets should have a setback on height.

STANDARDS

The adoption of minimum housing standards and city planning standards governing residential development indicates an intention to improve living conditions in a community, or at least to maintain conditions. Developing and enacting such standards indicates a social consensus about good living conditions or a consensus of the judgement of the technical specialists responsible for housing.

However, counterpoised against the standards and those groups which introduce and support them is a set of conditions in the community and the housing market which may be difficult to control. These human ecological forces may operate to produce high densities in communities, high densities within dwelling units and low quality in general. Briefly, this discrepancy between the standards and the human ecological forces is what the problem has been in Bombay. Inexplicably, most of the standards and laws governing developments till today bear a striking resemblance to the western models. Whereas, previously the private housing industry was able to supply housing to all classes, recent trends show that private developers serve only the wealthier sections of the society. Aside from the high cost of construction, the reason can also be partly attributed to raising of the standards. The only new housing for the non wealthy after independence have been shacks (hutments). Raising the standards to an extent comparable to the western cities actually has raised the cost of construction considerably and unfortunately has not had any significant impact towards the betterment of the environment. Briefly outlined are some of the instances where standards need to be carefully redefined, which have cropped up from the study :

•

Standards set on the use of materials - While minimum standards set for structural components of a building needs to be have stringent conditions for approval, the same need not be the case for infill elements. User participatory process in this context depends a lot on the capacity of user to bring in infill components as the housing process unfolds in time. Setting very high standards for these components can affect their capacity considerably. Given enough control, the user is bound to improve his living conditions in time and therefore relaxing standards of materials regarding these components can only lead to better opportunities for the user to improve his own dwelling.

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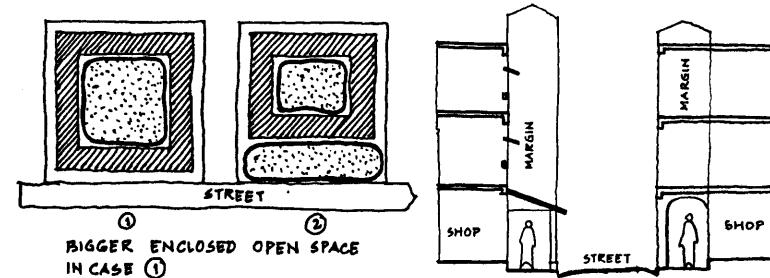
Infra-structure facilities - Since sanitary and bath facilities in a chawl are shared, the standard is set in the form of a ratio of dwelling units to number of toilets and bathrooms. The problem with such a standard is that with the same number of dwelling units, the population of a chawl might increase much more than the number of people it was intended for, with the result that the infra-structure gets overloaded. The load on the infra-structure is dependent on the number of people using it and not the number of dwelling units and hence the standard should be a ratio of the number of people to the number of facilities. The idea of such a standard is that the chawls must have the potential for infra-structure development with the increase in population to maintain the ratio. This is possible only as a coordinated effort on the part

of the resident groups and the authorities. In this case, the clause should set as a design imperative so that provision for such additions could be assured to the users.

- Space standards - specified in these standards are ratios of area per person and persons per room, minimum heights between floor to ceiling. The standards presently serve little purpose since these ratios are presently governed and manipulated through clauses like FAR. Besides unless the dwellings have an enormous potential to grow, these standards in reality cannot be met. Given the socio cultural context one is faced with, such English bases of ratio of persons per room are highly unreasonable because to achieve such standards every chawl resident would require at least three bedroom apartments. At the level of the chawl, it is really the amount of habitable space that counts - spaces like mezzanines, lofts, which are not included in the standards. One only needs to observe how even with a 10'-0" floor to ceiling height people have built lofts (which are barely habitable), for the purposes of living. Following this rationale, I think it is reasonable to increase the floor to ceiling height to a minimum of 12'-6" and counting the mezzanines as being a part of the habitable space. Undoubtedly this involves additional expenditure but compared to the other alternative of providing additional rooms it certainly is more reasonable.

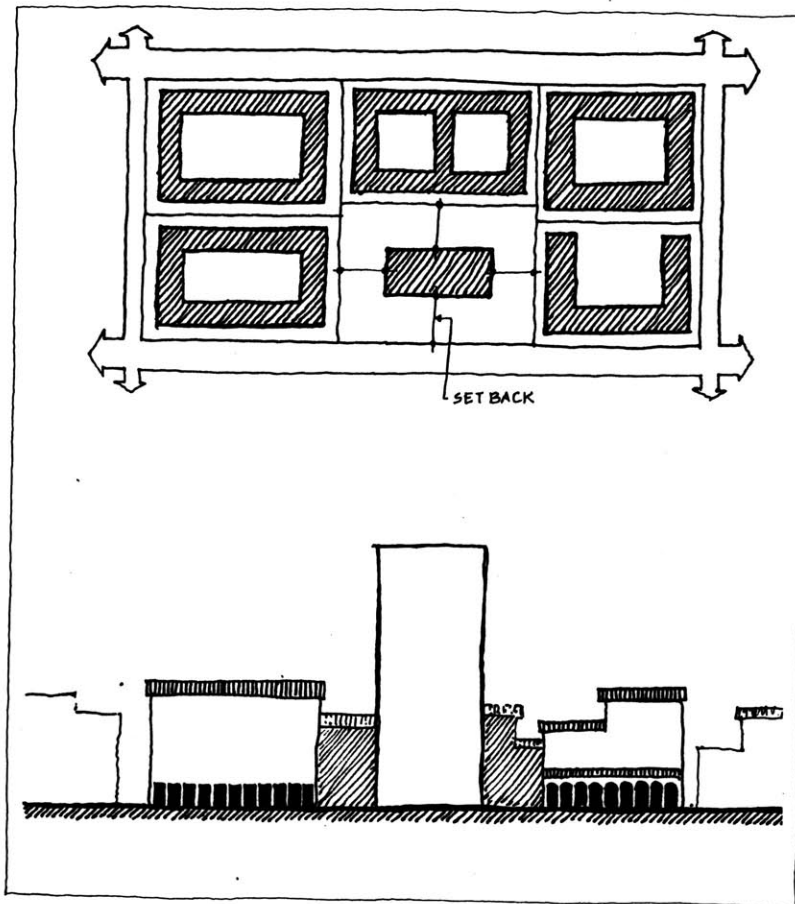
- Set-back rules - These were introduced by the so-called English 'sanitarians', who were in charge of the urban

improvement at the time. Their first moves were to cut broad straight streets in grid-iron patterns as opposed to the narrow winding streets existing. The manifest purpose was to speed traffic flow, facilitate fire fighting and prevention, and to improve ventilation and prevent contagion.

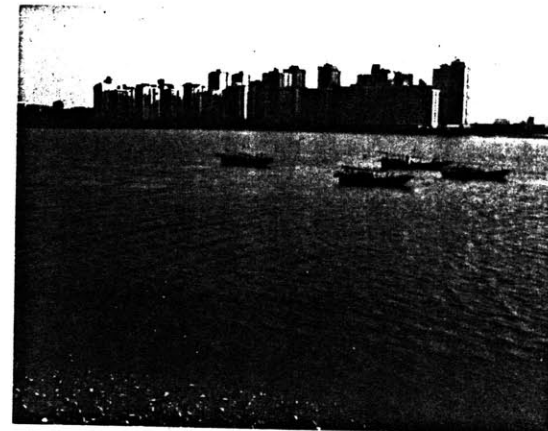


In arguments which sound contemporary now, Patrick Geddes (1947 : 45) stated that this policy of widening streets was destructive and counterproductive. He observed " the policy of sweeping clearances....[is] one of the most disastrous and pernicious blunders in the chequered history of sanitation. He also argued that clearances displaced families, overcrowded other areas and served the rank renting' interests! He was opposed to the idea of wider streets and thought that narrow streets were adequate. Moreover he also approved of buildings abutting streets as it allowed for bigger open spaces inside. Geddes method reflected an appreciation of Indian urbanism and community life on its own terms. I can't but agree with Geddes' viewpoint, and would go to the extent of suggesting that the setback in front be used as a margin that could be a covered pedestrian walkway as is observed as a theme in various parts of the city. Besides being particularly suited to Bombay's climatic condition, it also serves as an extension of the commercial activities taking place on the first floor.

The set-back rule can lead to a development which is totally incongruous to the present urban fabric. As is exemplified by the recent developments, the high rise tower block is the most likely form of development given the FAR and the set-back rules. On the other hand, the distances between two buildings are found to be inadequate for light and ventilation and so are the light wells. In this respect, the models proposed earlier can serve as useful guidelines.



Enumerated above are only some of the aspects of standards which bear direct relation to the study I have done. This in no way covers this vast and complex issue completely as a great deal of attention must also be devoted to basic issues like regulating population density, which must form one of the major planning decisions.



CONCLUSIONS

Surmising, the situation in Bombay is indeed a dilemma. The city's physical attributes along with the tremendous economic growth makes high density inevitable.

On the one hand we have these intensely crowded areas almost choking the city; on the other hand, it is also true that these are the areas which contributes mainly to Bombay's unique charm and cosmopolitan prosperity, with all its narrow meandering street patterns and continuous facades of incredible richness and verve.

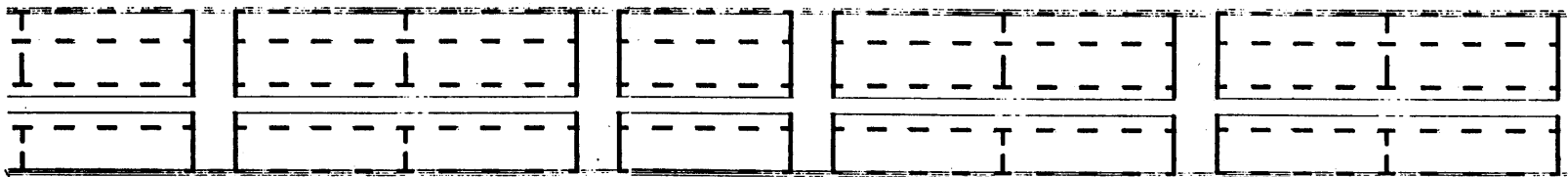
On the one hand we have most of the buildings (which are essentially chawls) in a dilapidated condition; on the other hand these are the buildings sharing most of the burden of housing the city's enormous densities at a cheap rent. Clearly, the charm needs to be retained as much as something needs to be done to the problem of these dilapidated buildings and towards ameliorating the derelict living conditions here.

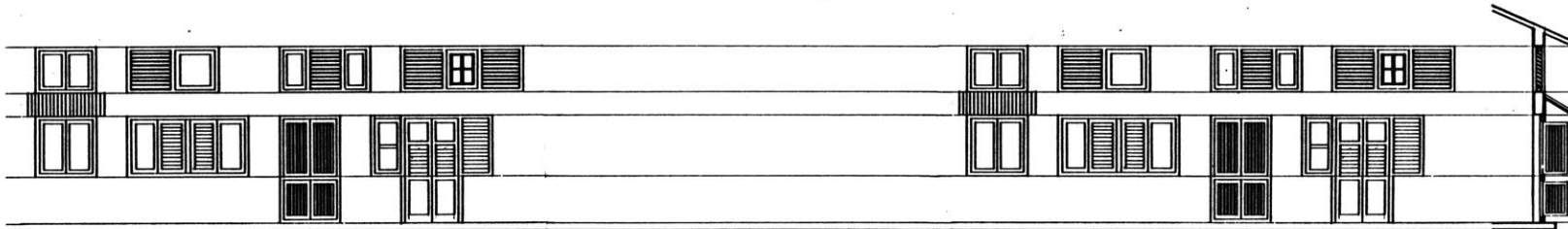
Displacing the population can be a very controversial issue since that can only pull people further away from their place of work which in itself is hard to justify because of the significant difference it can make to the affordability factor simply due to transportation costs increasing manifold.

Providing individual self contained dwelling units is not reasonable because the cost of development makes them unaffordable for the target resident groups. Besides the units themselves are too small to adequately meet the space requirements of the diverse family types in context. For the same reason, current trends in the city shows a marked preference for the chawl type even amongst the housing cooperatives.

The dilemma however does not end here. If one were to project future demands, on the basis of the assumption that New Bombay follows the same trajectory of development, then we have a similar problem of adopting a house type that can be implemented as a viable design strategy.

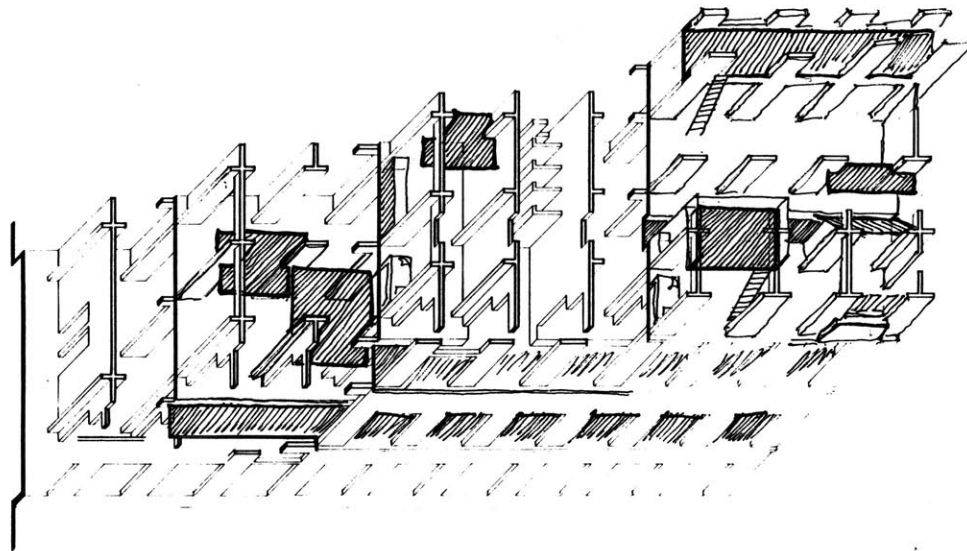
Considering that the private sector is the major source of housing stock in Bombay, the total lack of private sector indulgence in such housing during recent years becomes prominent. Previously, most of the chawls were privately developed, and due to cheap labor and cost of construction, they could still make profit out of the rent they received. Today due to rent control and expensive cost of construction, this is no longer a lucrative proposition and so there is no incentive to build this kind of housing anymore for the private enterprise. The situation certainly needs to be





rectified and the potential for the chawls to provide such kind of incentives seems to be there. It is necessary to promote mixed income resident groups characteristics of the chawl. This, coupled with the potential for accommodating commercial activities can ensure speedy capital returns, enabling the developers to subsidize the lower income groups.

On the design aspect, it is evident that in this present situation, the philosophy must be rooted in principles of evolutionary housing strategy, which was the starting point of this entire endeavour. The idea of providing completed houses will always fail because it tries to anticipate dwellers action in the form of "a design". Users will have to be allowed to participate in the decision making process. The further down we come in the decision making hierarchy, the more active contribution we can expect of the users. The more detailed the planning, the greater the need for user planning, where the actual users are involved in solving their own problems. The decision sequence could be as follows :



	1. THE HOUSING SCHEME (traffic layout, overall building grouping,). In the case of existing chawls this phase does not apply as it is already decided.	2. THE BLOCK (size, courtyards) In the case of existing chawls, the processes are simpler, since the user groups know each other over the years	3. THE INDIVIDUAL DWELLINGS (plan, choice of equipments)
LEVEL OF PARTICIPATION	COLLECTIVE COMPRISING OF REPRESENTATIVES FROM DIFFERENT RESIDENT GROUPS	COLLECTIVE - RESIDENTS OF THE CHAWL	INDIVIDUAL

In the case of the chawls, the decision making is facilitated to a great extent since the rules are easily comprehensible, and unlike other types, teaching the users on what they can do need not be a long drawn process. Once there is a general consensus amongst the resident group on the supports, party wall negotiations can take place even while the building is under construction.

What I have stated are nothing new but are useful enough to be reinstated. The logistics of all these aspects need to be carefully

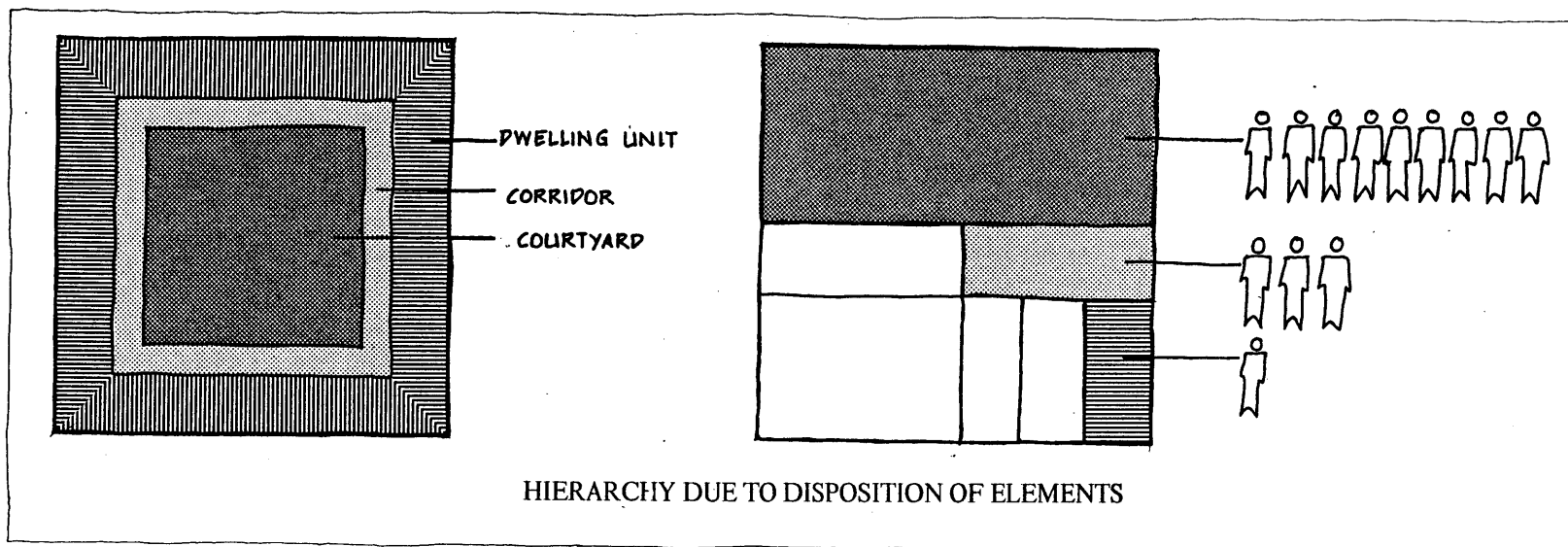
formulated, which however does not the scope of this present research.

The study intends to clarify the popular misconception about the unworkability of the chawl as a house-type. Given the context, the chawls suggests positive evidence of its viability as a potential house-type. The type itself is a product of high density and the socio cultural context of Bombay. To the designer, the elements comprising a chawl and their dispositions allow for easy manipulation. The type has enough spatial flexibility that can be used to accommodate a wide range of spatial

requirements.

It is only to the advantage of the type that the semi-private and the semi-public domains find extensive application in the traditional Indian life-style, because the dwellings themselves are small. Unlike the other house-types that have been adopted in Bombay, these two domains form inherent components of the chawl. It is therefore extremely critical in this case, to ensure proper utilization of all the spaces provided, essentially the semi-private and the semi-public domains. As a designer, it becomes useful to grasp the quintessential relationships that exists between the elements at different levels.

One needs to understand the hierarchical relationships between the different levels and the order that generates them, since the strategy should be for separating individual and collective decision making and combining a continuous process of individual housing activity within the framework of a collective built environment.

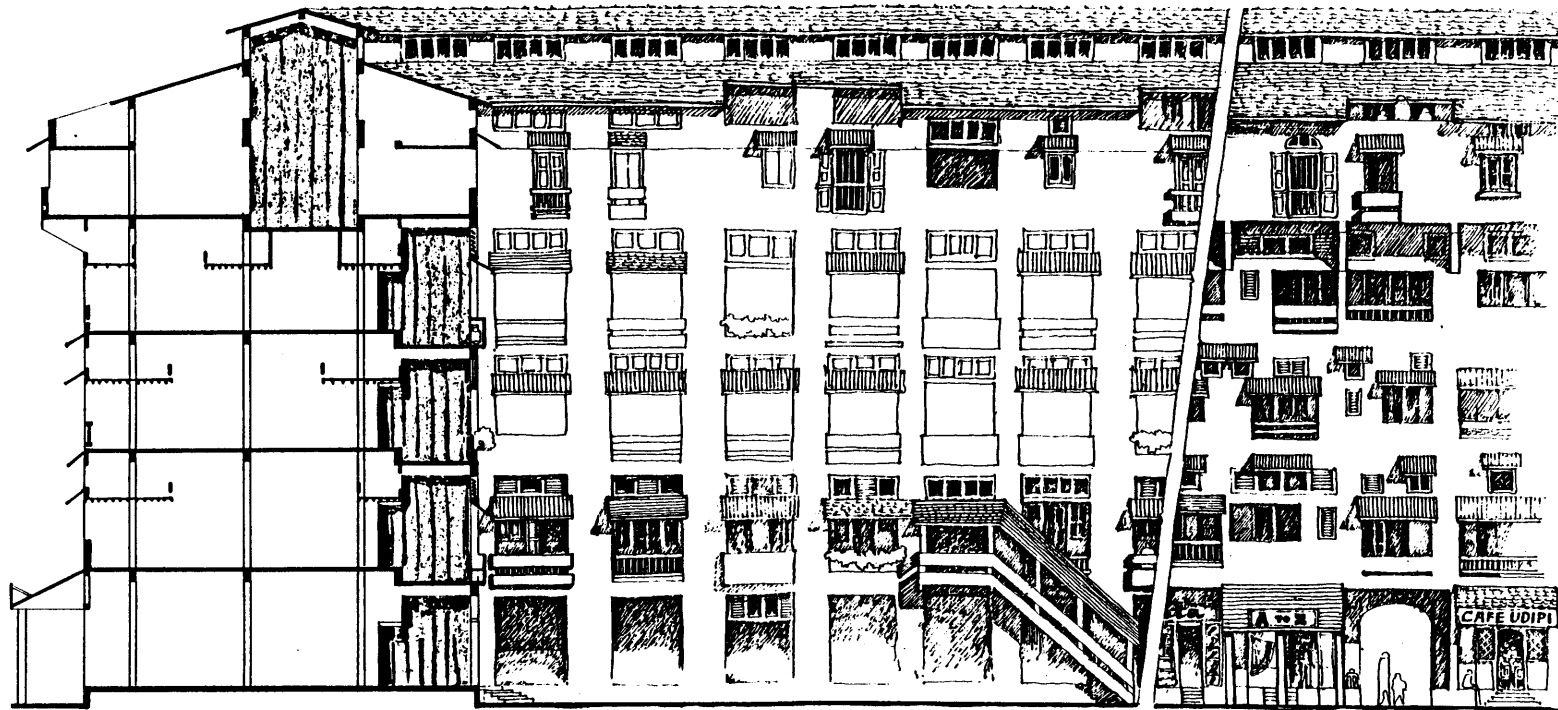


As a method, my effort was to devise ways in which the morphology of a house type could be tested using issues borne out of a contextual background. The issues chosen are decidedly physical in nature, although the social, cultural and economic undertones are implicit in them. Certain idiosyncratic values of the people (like place for worship, decorating the floor etc.) needs to be respected and physical connotations understood while making ones own value judgements. Since the study is meant to be used as a comprehensive guide to anyone who needs to intervene in that

context, I have attempted to illustrate what those physical connotations could be. Undoubtedly, there are many more interpretations that is not only possible but also desired.

As a method, I have also attempted a way of interpreting agreements or formulating rules that can help anyone generate designs that adhere to the morphology of a type.

At the broader level, it is the processual aspect of design I was dealing with, an effort to rationalize decisions regarding physical elements on site. The chawl due to its inherent simplicity, was a good starting point.



Finally, something deep down reminds me that even while writing this study, there are hundreds of chawls awaiting their final verdict from the authorities on their future - will they survive another monsoon, or?

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